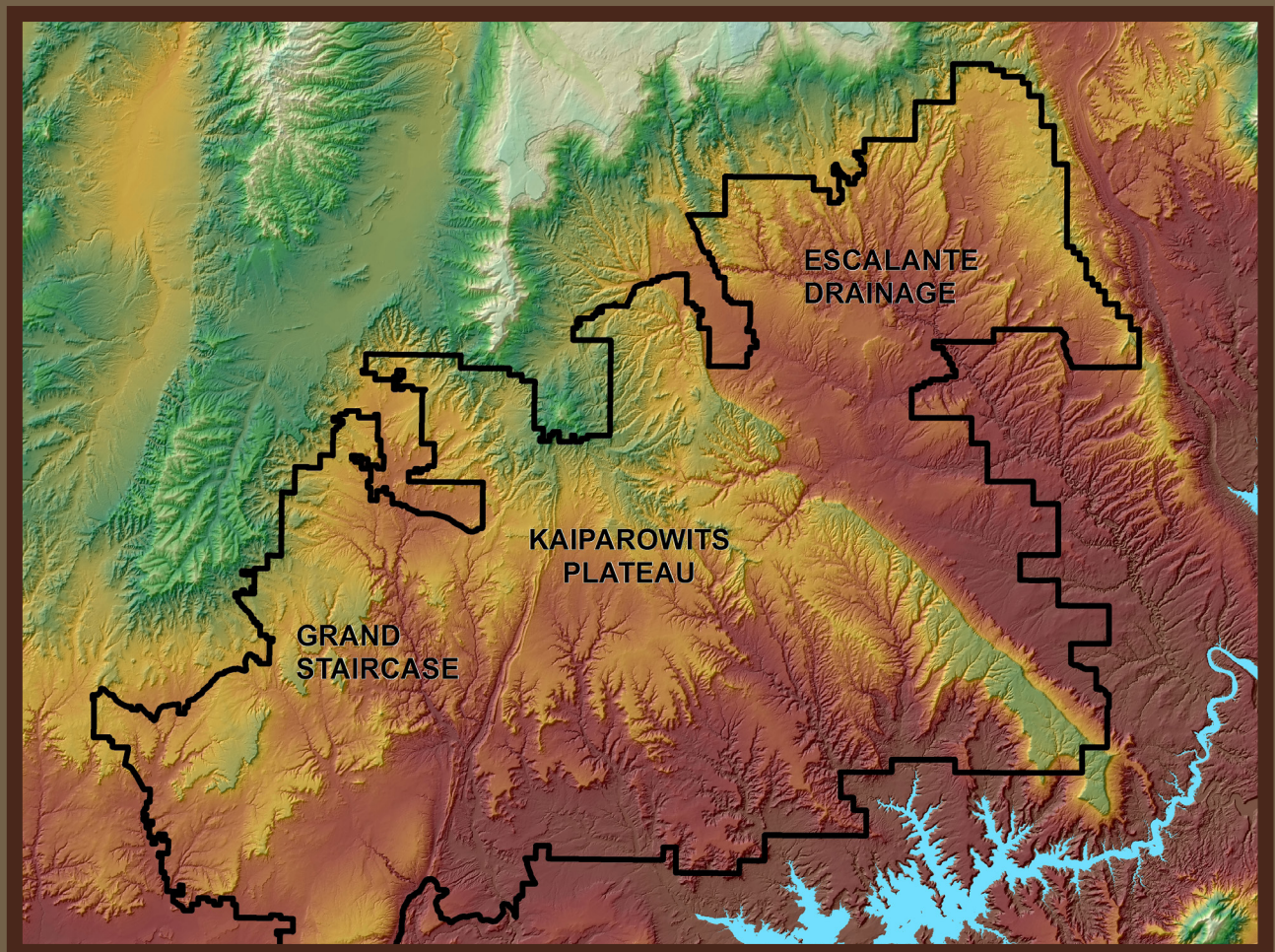


FORMATIVE CHRONOLOGY
AND SITE DISTRIBUTION ON THE
GRAND STAIRCASE-ESCALANTE NATIONAL MONUMENT:
A RESEARCH REFERENCE



DOUGLAS A. MCFADDEN

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The “story” bowl, a Virgin Anasazi vessel with Basketmaker III, Pueblo I, Early Pueblo II, and Late Pueblo II design elements. Used with the permission of Karen Alvey

DOUGLAS A. MCFADDEN

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PREFACE

This document was begun as a means of disseminating chronometric and excavation data that accumulated over the 20 year period between 1976 and 1996, when the Grand Staircase-Escalante Monument was established. The initial draft was completed in 2000 with the able formatting and graphic abilities of Camille Ensle; the final with the patience and formatting skills of Daisy Johnson. Gardiner Dalley edited the early version and was involved in nearly all of the in house excavations. The initial GIS maps were made by Matt Betensen and updated by Dan Alberts of the Kanab Field Office. The support of various managers including Verlin Smith, Kate Cannon, and especially Marietta Eaton is acknowledged. The late Garth Portillo, State Office archaeologist, provided funds for dating which were especially appreciated. Particular thanks goes to current Monument program lead Matt Zweifel for encouraging completion of the final version and providing the means to do it.

Most of the BLM generated data presented here originated on lands managed by the Kanab and Escalante Field Offices of the Cedar City District. These lands comprised half of the District's five million acres that I was responsible for as the Area Archeologist from 1976 to 1996. In 1996 President Clinton designated 1,900,000 acres of those lands as the Grand Staircase Escalante National Monument. While the management changed, the areal extent of the study has not - the original intent to characterize spatial and temporal patterns for the Grand Staircase, Kaiparowits Plateau and the Escalante basin, regardless of land status, remained the same.

This study is very much a product of traditional BLM cultural resource management. However, Monument status after 1996 increased the scope and capability of the archaeology program substantially. The initial draft served well to organize the survey and excavation program under the new Monument mandate to do science in addition to cultural resource management. The challenge then became doing archaeology in the context of CRM. Subsequent survey and excavation carried out in-house, under contract, and through cooperative

agreements, have yielded a significant amount of new data including dozens of radiocarbon and tree-ring dates. Recently, luminescence dating of Shinarump Red Ware sherds from the adjacent Vermilion Cliffs National Monument, generously funded by the Grand Canyon Trust, has contributed to a preliminary but promising method of dating sites based on their red ware frequencies.

Clearly, the volume illustrates there are few, if any, sites that have exhausted their research potential. Even those that have been totally excavated or otherwise lost have curated collections (mostly at Southern Utah University) that keep the resource alive. Perhaps the best example of "banking" the resource for future use is the Arroyo site where over 80% of the site remains for posterity. Other examples of limited excavation include the Road Kill, Dead Raven, and Park Wash sites. Preservation for future use is not only a mandate of cultural resource management, it is a basic tenant of good science - it both conserves the nonrenewable resource and allows for future reassessment of earlier findings.

It is rewarding to realize how much of this volume builds on the work of early archeologists; sites investigated by Neil Judd, Jesse Nusbaum, Julian Steward, and the Monument Valley Rainbow Bridge Expedition are all elaborated on in this study. During the late 1950's and early 1960's Jesse Jennings' Glen Canyon Project and related investigations on BLM lands were carried out by Florence and Robert Lister, James H. Gunnerson, Don D. Fowler, and C. Melvin Aikens. Their investigations expanded the range and scope of the earlier work tremendously, but produced only a handful of tree-ring dates within the study area - mostly from the Coombs site. The result was a roughed-in culture history but one that lacked absolute dates necessary to organize local sequences and relate them to adjacent culture areas. Happily, in 1976 the initiation of a serious BLM cultural resource program provided the means and opportunity to begin chronology building on a regional level.

While the main purpose of this reference is to provide raw dates and describe their contexts,

Preface

multiple hypotheses addressing key research issues for each of the three physiographic/cultural sections are expanded on in this version. On the Grand Staircase, the complex relationship between Virgin site structure, settlement patterning, and subsistence is considered; for the highly varied Escalante country a model of Fremont adaptation is presented and, in

the same physiographic area, a discussion of the late PII Anasazi-Fremont socioeconomic relationship is offered. Future investigators might choose to pursue these lines of inquiry - or not. At any rate, the temporal and distributional data presented here should serve future research and management of the resource well.

INTRODUCTION

The Formative period (B.C.100 - A.D.1300), and to a degree the transitional period leading up to it in the Grand Staircase-Escalante National Monument (GSENM) study area, is characterized by the practice of agriculture, the construction of substantial dwellings, the development of long-term storage facilities and eventually, the production of pottery. It is generally considered a stage during which mobile hunters and gathers became more sedentary (Willey and Phillips 1958) and presumably, more socially complex. Two separate, archeologically defined, Puebloan cultures are recognized on the Grand Staircase-Escalante National Monument and surrounding region; the Anasazi and the Fremont. Both are "Puebloan" and although they have much

in common with one another, they are separable on the basis of their material culture, the geographies they occupied, and perhaps most relevant, their distinctive adaptations to the unique environments found on the Monument (Figure 1).

The Fremont occupied much of northern Utah; within the study area their material culture extends south to the Pink Cliffs of the Grand Staircase, on to portions of Kaiparowits Plateau and into the Escalante drainage basin. Based largely on their use of the ceramic type Emery Gray, they have been assumed to be an extension of the San Rafael Fremont (Jennings 1966). The long sequence of dates presented in this document strongly suggest that Fremont occupation in the Escalante drainage represents a long-lived local adaptation that

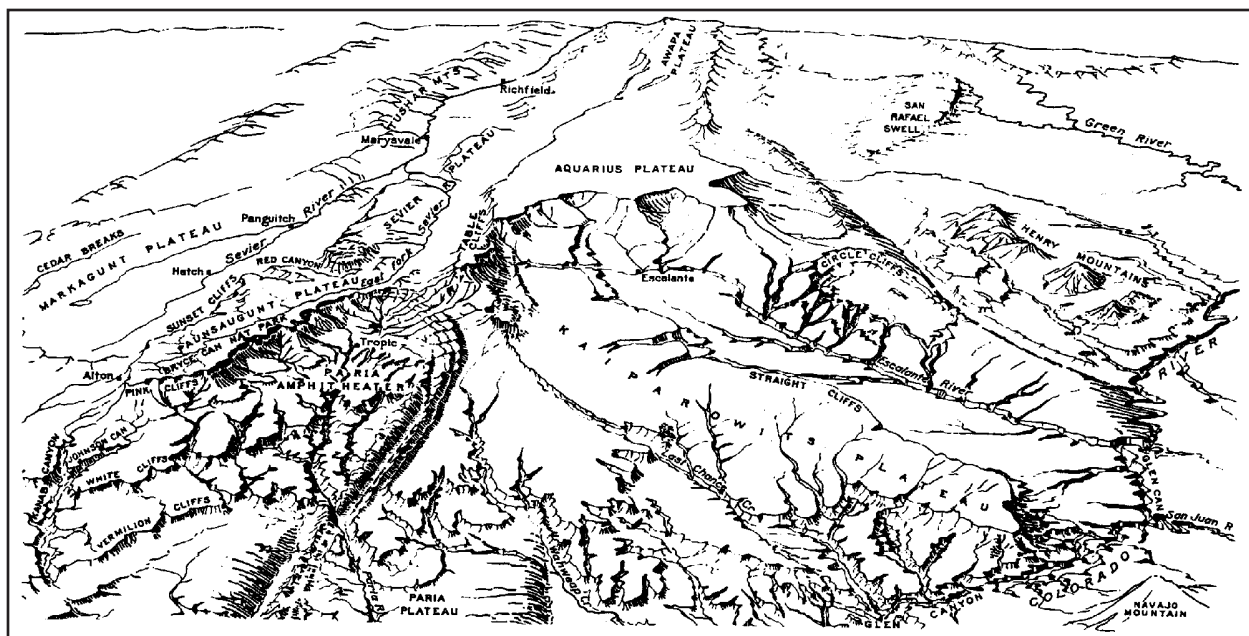


Figure 1. Sketch of Grand Staircase, Kaiparowits Plateau, and Escalante Drainage (Gregory and Moore 1931).

Introduction

began in the Archaic Period and continued as an identifiable entity until contact with the Anasazi during Pueblo II times.

The Virgin Anasazi occupied the Grand Staircase physiographic section of the Monument. Their communities are well documented in a wide range of environments in the St George Basin, southeastern Nevada, and the Arizona Strip. Traditionally the Virgin Anasazi have been considered an extension or branch of the Kayenta Anasazi - and therefore they could only be understood by reference to that group. In fact, the continuous thirteen hundred year sequence of occupation on the Grand Staircase described here makes it abundantly clear that Virgin archeology can, and should be, understood as an entity as distinct as other Anasazi traditions i.e. the Mesa Verde, Kayenta, and Chacoan.

Recognizing discrete social groups in the archeological record, i.e. doing "culture history", has not been a favored approach in recent years. This is unfortunate because our control over the spatial-temporal and formal aspects of archeological data has advanced to the point where fine distinctions can be made. For example, on the Monument, an argument has been made for population movement as a major factor in understanding culture dynamics. The recognition of a strong Kayenta influence during Pueblo II times, on both the Grand Staircase and Kaiparowits areas, is an important case in point: At about the same point in time a similar influence occurs on two very different cultures. A separate chronology for the Kaiparowits "Kayenta" manifestation permits an understanding of these relationships. Emphatically, employing the spatial-temporal-formal controls of culture history does not negate the use of currently favored behavioral and selectionist approaches - it enhances them.

This paper is a synthesis of radiometric assays and tree-ring dates from over 100 sites on or near the Grand Staircase-Escalante National Monument (GSENM). An attempt has been made to include all Formative dates, as of the spring of 2015. Many of the reported dates are discussed and their radiocarbon tables have been reproduced. The main focus of this effort however, is to review the growing number of dates from sites on and around the GSENM that have not been previously reported.

The radiocarbon and tree-ring dates reported here have been collected from both intensively

excavated sites, and in many cases, from surface contexts in sheltered sites - usually in association with architecture and diagnostic artifacts. The site descriptions consider the dates context, assesses its reliability, and considers artifact and architectural associations. A considerable number of sites excavated on the Monument during the late 1950's and early 1960's were never dated with these methods; radiocarbon dating was considered too coarse and local tree-ring chronologies were not yet developed. The assumption at that time was that ceramic cross-dating with ceramics from tree-ring dated Kayenta sites would be sufficient to determine temporal placement. As a result, sites excavated during this era were assigned only a rough temporal placement. In some cases, e.g. the Alvey site (Gunnerson 1959, Geib 1996), the antiquity of the local occupation was never fully appreciated. Geib's recent dating of maize from the Alvey site demonstrates the tremendous potential for applying modern dating techniques to curated artifacts and thereby breathing new life into old collections and their interpretation.

New interpretations and refined temporal placement are also offered for excavated sites that did not yield datable material; recent advances in temporal control over local ceramic and architectural types now permit their placement in local sequences. For this reason, they are also described in this report.

In 1976, with the passage of the Federal Land Policy Management Act (FLPMA), the Bureau of Land Management began its cultural resource management program in earnest. There were no radiocarbon dates from the Monument or the Grand Staircase physiographic section. The tree-ring situation was not much better; one non-cutting tree-ring date was reported from the Parunuweap Knoll site below Zion National Park (Aikens 1965); an unverified date existed for Cave du Pont collected by Stallings; a single tree-ring date from 42Ka547 on Fiftymile Mountain, and a cluster of dates from the Coombs Site in Boulder (Bannister et al. 1969).

The lack of dates encouraged interpretations that questioned the very existence of local sequences: Regarding early reports of Basketmaker II and III occupation in the Virgin culture area Florence Lister suggested that "...it is time to ask if these men (Judd 1926; Nusbaum 1922; Schroeder 1955; Steward 1941 among others), were not straining too hard to make the clues confirm preconceptions

that demanded a neatly stratified historical reconstruction beginning with early and ending with late” (Lister 1964:67). She went on to say “Probably the major occupation of this region north and west of the Colorado endured for scarcely more than 150 years and was never large or concentrated” (Lister 1964:68). As CRM inventory in the area expanded, so too did the evidence for a substantial and long-term occupation during the Formative Period. Collection of both radiocarbon samples and tree-ring specimens became an important goal of the Cedar City District cultural resource program. This legacy has served the Monument well as it continues to build on the earlier work.

DATING METHODS AND SPATIAL DISTRIBUTION

Two considerations should be kept in mind while assessing the radiocarbon dates provided in this paper: C13/12 corrections and calendar calibrations. Until recently most radiocarbon dates were expressed in radiocarbon years before present (RCRBP), with present considered to be A.D.1950. Measured C13/12 ratios vary according to the material dated. Their measurement can increase the accuracy of the dates dramatically. For example, the measured C14 age of a charred corn cob from 42Ka4280 (Beta 131667) is 1020+/-40 B.P.. Applying the measured C13/C12 ratio of -11.2 yields a conventional C14 age of 1240+/-40 B.P. i.e. 220 years earlier. Measured C13/12 ratios are provided in the tables when calculated; however, most ratios have been estimated based on values typical of the material type. All maize dates have been adjusted, however not all samples were checked to determine if the age quoted was C13/12 corrected (Darden Hood personal communication 1995).

The second consideration is that nearly all of the dates have been tree-ring calibrated. This method became widely accepted in the 1980's - although not everybody embraced it (c.f. Berry 1982). In 1995 Darden Hood of Beta Analytic provided the calendar calibrations, accompanied by graphs, for all dates on file in the Cedar City District. In addition to an increase in accuracy, these calendrical calibrations allow for the direct comparison of radiocarbon dates with tree-ring dates.

The first tree-ring dated site in the study area was Cave du Pont excavated by Jesse Nusbaum (1922). Nusbaum collected five specimens in 1936 that had been cached in the cave since his excavations in 1920. Stallings (1941) dated the wood to A.D. 217. This date was subsequently rejected as not up to modern standards (Bannister et al. 1969). The recently developed Mammoth Creek chronology, based on Bristle Cone Pine near Cedar Breaks, has extended the local tree-ring sequence back to about 300 B.C. Recently the Cave du Pont sample was re-analyzed and found to be acceptable (William Robinson personal communication 1992).

Robinson and Cameron (1991) report dates from eight sites from the study area in their *Directory of Tree-ring Dated Prehistoric Sites in the Southwest*. This directory is updated on a monthly schedule. The version referred to here is November 1991.

In 1998 the GSENM commissioned the Laboratory of Tree-Ring Research to review the material collected during the Glen Canyon Project. Approximately 170 undated samples from 16 Glen canyon and BLM sites were reexamined. “Plots of these samples were compared to all available nearby dated ring chronologies, most of which were constructed since the most recent examination of the samples. The hope was that better chronological control afforded by these new master chronologies would permit the dating of samples that hitherto had resisted time placement” (J. Dean personal communication 1998). Unfortunately, none were datable. Dean goes on to say that he is confident that future augmentation of the chronologies will eventually permit dating.

Since late 1970's potentially datable samples from open sites in both the Kanab and Escalante areas have been collected. All samples were submitted to the Laboratory of Tree-Ring Research at the University of Arizona. All submissions, regardless of whether they were dated, are listed in Appendix B. The biases inherent in collecting from open sites is obvious - dated sites are usually late architectural types in sheltered locations. There is good reason to believe however that as more open architectural sites are excavated the tree-ring record will become more representative of the sequences.

This report is intended to be a descriptive account that places artifacts and architecture - their types and styles - in time and geographic context on

Introduction

the GSENM and surrounding area (Figure 2). Its organization is straightforward; the initial section describing the sites has been organized primarily by geographic area - the Grand Staircase, the Kaiparowits Plateau and the Escalante drainage. The sites are then listed chronologically allowing the identification of similar traits and features. These “diagnostic” material culture traits are then grouped into temporal units that will permit the placement of undated sites in a temporal context.

Three useful chronological frameworks have resulted from this exercise: the Virgin Anasazi on the Grand Staircase, the Escalante Fremont (viewed as a local variant of the San Rafael Fremont) and the “Kayenta” Anasazi on and around Fiftymile Mountain - each is considered a local sequence in the classic sense (Willey and Phillips 1958); they place artifacts, architecture, and site types in time and space on the Monument. While three separate

chronologies for an area encompassing about 2,000,000 acres might be questioned by those who view Puebloan cultures of the region as “sociocultural continuums” (Madsen 1997; Madsen and Simms 1996), it remains that each sequence does trace a geographically discrete pattern of behavior through time (Figure 3). In fact, the chronologies can be read either as representing individual culture histories or they can be employed to support the view of a spatial-temporal continuum of material culture - to a degree, the data support both perspectives.

Following the description of each chronology is a discussion on the spatial-temporal distribution of sites in both their environmental and social contexts. This section is more speculative, it describes settlement patterns emerging from the data and their implications for defining discrete adaptive systems on the Monument.

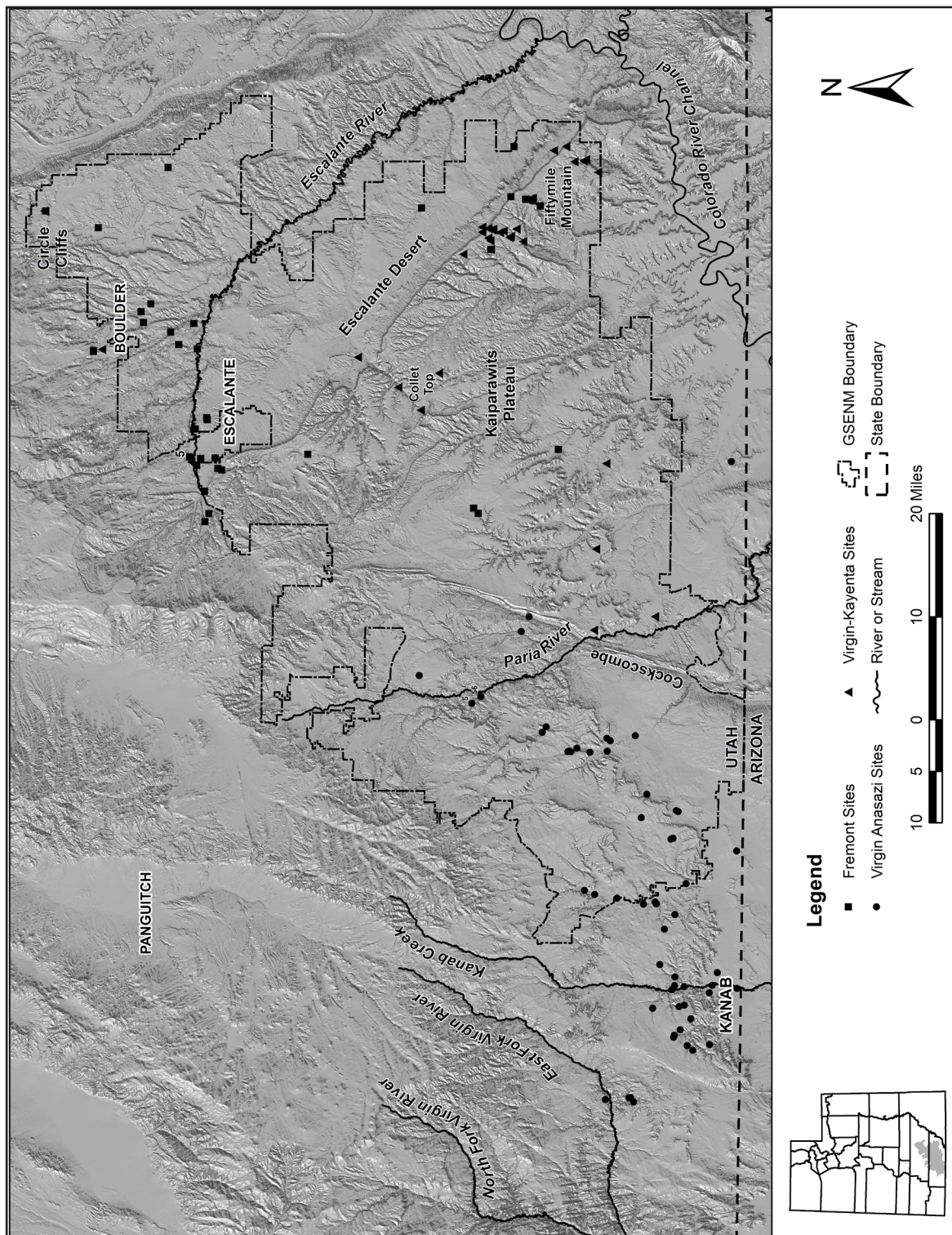


Figure 2. Selected dated/excavated sites reported in this volume.

Cal. Years	<u>Arizona Strip</u> Virgin Anasazi After Fairley 1989	<u>Grand Staircase</u> Virgin Anasazi This volume	<u>Kaiparowits Plateau / Escalante Drainage</u> “Kayenta” Glen Canyon Proj.	<u>“Fremont”</u> After Geib 1996
1300				
		----- Pueblo III	Abandoned	
1200	Early Pueblo III		Late Pueblo II	Late Formative Period
1100	Late Pueblo II	Late Pueblo II		
	Middle Pueblo II			
	Early Pueblo II			
1000		Early Pueblo II		
900	Pueblo I			
800		Pueblo I		Early Formative Period
700				
600	Basketmaker III	Late BM III		
500		Early BM III		
400				
300				
200		Basketmaker II		Early Agricultural Period
100	Basketmaker II			(to 400 BC)
0		-----		
100				
200				

Figure 3. Formative Chronologies in the Region.

VIRGIN ANASAZI ON THE GRAND STAIRCASE

RESEARCH ORIENTATIONS AND CHRONOLOGY BUILDING

The earliest observations on the Puebloan occupation of high plateaus north of the Grand Canyon were made by Neil Judd for the Bureau of American Ethnology. Judd surveyed and conducted limited excavations in Cottonwood Canyon near Kanab in 1915 and again in 1919 (Judd 1926). Eight “caves” with architectural remains were described in some detail. Slab-lined storage cists, pithouses, masonry roomblocks and their associated artifacts were observed, and in some cases, excavated. Southwest archeology was in its infancy and the temporal paradigm of the time revolved around the relationship between the “Basket Makers” and the later “Cliff-dwellers.” In his conclusions it is apparent that Judd considered them separate peoples rather than part of the same sequence.

“Both the Basket Makers and the Cliff-dwellers were agriculturalists, the latter more so than the former. They inhabited the same caves, and the late-comers frequently rifled or destroyed the storage cists and other visible remains of their predecessors. The Basket Makers left no permanent habitations; the Cliff-dwellers were house builders who employed rude masonry at times, and again adobe mud supported by posts. At some sites, notably cave 1 and 4, there appears to be a fusion of the slab-lined Basket Maker cist with the post-and-mud wall of the Cliff-dweller houses. This may prove to be only the writer’s fancy, for it must be admitted that our hurried observations in this section are inconclusive. Additional and more painstaking study must be made before the two prehistoric cultures represented can be thoroughly and individually understood” (Judd 1926:123).

These initial and tentative observations on the occupants of Cottonwood Canyon set the stage for the eventual definition of a continuous sequence of culture change that lasted over 1200 years.

(Note: Both Cave 1 and Cave 8 have since yielded evidence for what Judd termed “near-Cliff Dwellers” i.e. Pueblo I occupation.) The distribution of those sites is now recognized as extending over the Grand Staircase region of the Colorado Plateau and beyond to northern Arizona and southeastern Nevada. This “culture area” was eventually termed the Virgin, or Virgin Branch, of the Anasazi (Gladwin and Gladwin 1934). Its relationship with the larger puebloan world continues to be a subject of debate. The approach taken here is to consider the Virgin Puebloans of the Grand Staircase as a viable analytical unit based on its spatial integrity, temporal continuity and setting within an ecological zone that permitted a high degree of autonomy.

Just a year after Judd returned to Washington D.C., Jesse Nusbaum from the staff of the Museum of the American Indian, Heye Foundation, arrived in Kanab to excavate Cave du Pont - a site that was destined to become the classic Basketmaker type site. It is remarkable how these early investigations have retained their importance to our understanding of southwestern prehistory. Both Judd’s and Nusbaum’s reports, and the sites themselves, continue to provide important data. For example, the possibility of obtaining tree-ring dates from the preserved wood in these sheltered sites was just being realized during the early 20th century. Wood cached in Cave du Pont by Nusbaum was retrieved years later by Stallings (1941) yielding a tree-ring date of A.D. 217; that date was later rejected as not

up to modern dating standards but was recently verified using a newly developed local chronology. The A.D. 217 date is now incorporated into the Virgin chronology reported here.

Dr. Edward Palmer may have been the first to actually excavate on the GSENM. Judd noted that in 1877 he excavated a cave in Johnson Canyon and described several interesting Cliff-dweller artifacts. Dr. W. H. "Professor" Holmes visited Kanab a little later and described an ancient village of cliff-dwelling peoples south of Kanab (Holms 1886). While these efforts had little scientific impact on southwestern studies they seemed to have peaked Judd's interest in the areas research potential (Judd 1926:46, 47).

Julian Steward was the first prominent archaeologist to conduct investigations on the Grand Staircase portion of the Monument. In 1932, traveling with pack horses and a local guide, he recorded 142 sites between Johnson Canyon and the Paria River (Steward 1941). The indecisiveness over the relationship between the Basket Makers and the Cliff-Dwellers that concerned Judd had been resolved by the Pecos Conference in 1927. Steward's perspective was that, while the region was on the "Northern Periphery" of the Southwest, the sequence of occupation was "roughly comparable to the Basket maker II, III, and Pueblo I and II periods of the San Juan drainage. Steward's map of sites according to period (forerunner of our modern graphic information system) was the first attempt to illustrate the spatial distribution patterns that are

the subject of this volume (Figure 4).

As regards local site layouts, Steward described the semicircular arrangement of from three to six separate masonry rooms around the north side of a depression that he thought might be a kiva. This semicircular roomblock layout was considered unique to the area. It was later described by Schroeder (1955) at Zion Park and was considered by Aikens (1966) as the most distinctive trait differentiating the Virgin and Kayenta culture areas. Steward's observations on ceramics and architectural style were the sole basis for this remarkably accurate interpretation of the area's culture history - no absolute dates were available at that time. Recently obtained tree-ring and radiocarbon dates from several of the sites he recorded are reported herein; these dates confirm Steward's impressions of a continuous sequence of occupation on the eastern portion of the Grand Staircase physiographic section.

Albert Schroeder made a significant contribution to Virgin prehistory with his write-up of the Zion Park excavations conducted in the 1930's by Ben Wetherill and Elmer Smith (Schroeder 1955). Working from various fragmentary sources and partially burned notes, Schroeder described the pithouse architectural style now considered typical of Pueblo I, and also the presence of the semicircular layout of rooms around a depression that Steward had earlier observed nearly 50 miles to the east. Schroeder considered the Zion sites to be earlier than Steward's because they were

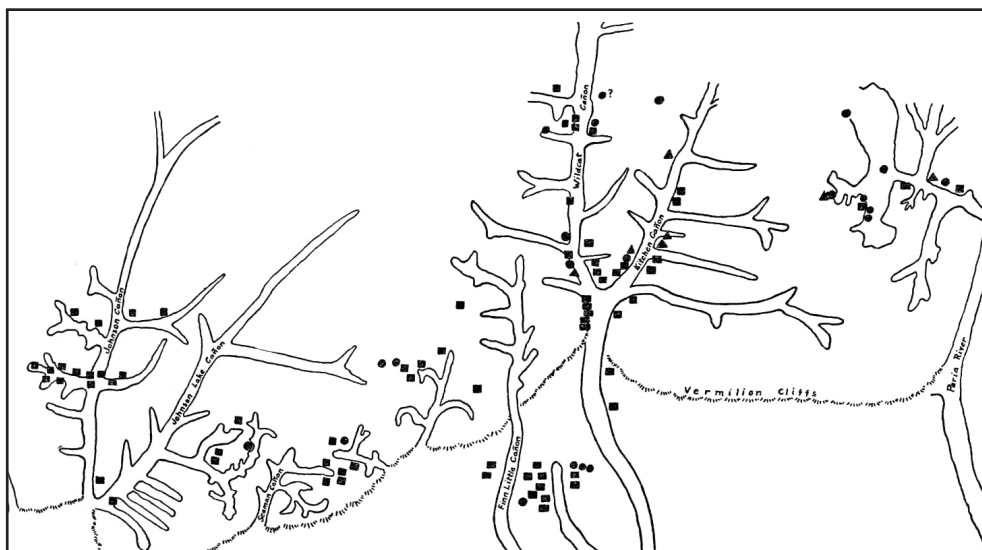


Figure 4. An early map of site distributions by period: circle is early (Basket Maker); triangle is transitional; rectangle is late (Pueblo) (after Steward 1941).

slab-lined rather than masonry and because there was no black-on-red, corrugated or late black-on-white pottery types associated with them. Schroeder agreed with Wetherill that early slab-lined storerooms in a semicircle around a depression represented storerooms around a pithouse dwelling, rather than residences around a kiva, as Steward had suggested (Schroeder 1955:20). Although there was considerable concern during this period about the contemporaneity, origins, and diffusion of architectural styles in the region - largely because no dates were available, these early descriptions were significant contributions and eventually helped to sort out ceramic and architectural developments typical of the entire Virgin culture area.

Until the 1970's so little excavation had taken place on the plateaus that individual sites had come to stand as representative types for entire periods. A good example is ZNP-3, a "unit pueblo formed around a courtyard" with a purported kiva to the south (Schroeder 1955:20) (Figure 5).

The interpretation of subterranean pit structures as kivas, initially suggested by Judd (1926), expanded on by Steward (1941), and eventually accepted by Schroeder (1955) and others continues to be problematic, even through recent excavations have demonstrated similar structures to be residential

pithouses - although possibly with secondary ritual functions. ZNP-3 was excavated by Wetherill and Smith in the 1930's, it is still often cited in the literature and is considered the classic early Pueblo II site. Temporal placement for the site is secure given it yielded only plain gray ceramics, St. George Black-on-Gray, and a few earlier Washington Black-on-Gray sherds; the details of its construction, however, are not so secure. Smith (1934) provides a brief description of the site's construction methods but states "The data collected from the site does not allow for a scientific reconstruction of the rooms and bins," even so, a diorama of the site on display at the Zion N.P. in the 1970's depicted its construction as having been accomplished as a single building episode. After a brief review of the excavator's observations, an alternate interpretation will be offered here. Not as criticism, but as a comment on changing perspectives over time.

The ZNP-3 site layout was a circular arrangement of individual slab-lined rooms, each abutting one another rather than having bonded walls. In addition to these storage rooms were three larger contiguous residential rooms. The pit structure to the south was assumed to be a kiva based on its location, the presence of "ceremonial" floor features, and presence of the residences incorporated into the pueblo. An alternative explanation, based on recent excavation data from Pueblo I and early Pueblo II sites, suggests that the roomblocks of this period were rarely built as units but instead were accretionally constructed, often modified, and rebuilt. With this in mind, and the knowledge that the "ceremonial" floor features are now known to be common in early pithouse dwellings, a different interpretation of the "kiva's" role in the development of ZNP-3 can be offered.

A typical sequence of construction on a site of this period involves the building of two or three storage rooms and a pithouse located off to their south. If occupation of the site continues, perhaps after episodes of abandonment, additional storerooms may be added and new residential units constructed with the old ones frequently abandoned. If this were the case at ZNP-3, the presence of a "kiva" - along with its implications for special function, social complexity, and diffusion from the east - is no longer at issue: the pit structure is simply a dwelling with formal floor features that once associated with a few storerooms and was

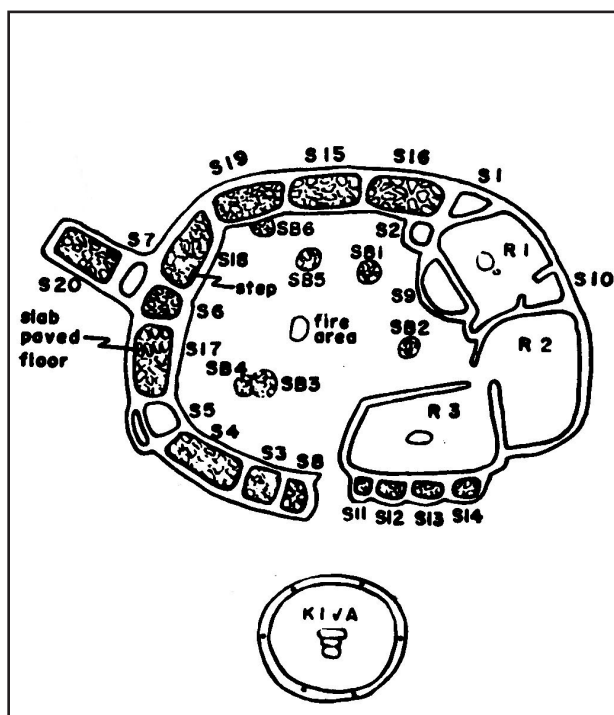


Figure 5. Plan Map of ZNP-3(Schroeder 1955).

abandoned as the site developed and residential rooms were added.

Because the excavation notes have been lost, the data from ZNP-3 can support either of the above interpretations. The point to be made here is that excavation in the Virgin region has only recently shifted from synchronic, site descriptions, to a concern with the dynamics of site development i.e. delineation of often complex site construction events and sequences that structured the site over time. Lengthy site occupational histories are a feature of the archaeological record on the Grand Staircase during the Formative period and, while they can be extremely challenging to date, with sufficient temporal control, they offer unparalleled opportunities to investigate settlement and subsistence behavior over multigenerational, even multi-Pecos period, spans of time.

Chronology Building

Steward was the first to employ the Pecos Classification temporal framework on the Grand Staircase, since it had been formalized just a few years before in 1927. The Pecos sequence of developmental stages, labeled Basketmaker II and III and Pueblo I, II and III, were eventually employed by Shutler (1961) as the basis for the Virgin Anasazi phase sequence in the Moapa Valley. Shutler redefined the phase names initially assigned by Harrington (1930), Gladwin and Gladwin (1934), and Colton (1952), and incorporated them into his own sequence. Although Shutler had no tree-ring or radiocarbon dates on which to base his sequence, his contribution was significant because he described not only ceramics but their associated artifacts, architecture, and settlement patterns. Even though these developments reflected local adaptations that have limited utility in the uplands, Shutler's scheme was generally accepted as applicable to the entire Virgin culture area and is still occasionally used by researchers on the Monument.

During the 1960's, the University of Utah's work on the Glen Canyon project was very much concerned with sorting out the culture historical relationships between the Mesa Verde, Kayenta, Virgin, and Fremont puebloan groups which they viewed as converging on the canyons of the Colorado. Various site distribution maps were produced which depicted areas dominated by one or

more of the groups (Jennings 1966:37; Lister 1964 viii). The Virgin culture area, known only by the limited investigations of earlier workers, was largely unknown. Notwithstanding the work of earlier investigators, the lack of a chronological framework based on actual dates resulted in skepticism that a continuous sequence of puebloan occupation even existed in the Virgin uplands. As late as 1964, Lister, in her summary of the Glen Canyon project, stated "But now it is time to ask if these men were not straining too hard to make the clues confirm preconceptions that demanded a neatly stratified historical reconstruction beginning with early and ending with late" (Lister 1964). Consequently, in an attempt to expand the context in which to understand the prehistory of Glen Canyon, a program of survey and excavation was carried out by Aikens (1965). Investigations were conducted on the west border of the Monument in Johnson Canyon and well as in the St. George Basin. This work resulted in Aikens' interpretation of Virgin and Kayenta cultural relationships - a good first approximation, but necessarily a very general one.

Aikens' main conclusions were: 1) Initially, the Virgin and Kayenta peoples did not constitute discrete sociocultural groups but rather were "participants in a uniform cultural pattern and sociological interaction sphere which had newly extended itself over the whole of the Southwest" (Aikens 1966:55). During the Basketmaker period, Aikens saw great uniformity in pithouse architecture and the simple Lino style ceramics that prevailed across the entire Colorado Plateau. Certainly greater variation can be demonstrated today than when Aikens wrote, but how much variation in the archeological record does it take to be significant? The pithouse plans and ceramic forms illustrated in the Basketmaker III site descriptions are unlike those found in the Kayenta area. The perspective favored here, for this variation on a central theme, is that relative isolation and adaptation to local environments by groups of widely separated horticulturalists accounts for much of the variation we see in the archaeological record.

By approximately A.D. 900 Aikens saw the Virgin and Kayenta cultures as diverging and coming to be "separate sociocultural populations" (Aikens 1966: 55). The most significant difference was the circular or horse-shoe patterned room block that dominated in the Virgin and the straight-line or "L" shaped block that dominated the architecture

of the Kayenta. Ceramics were also cited as coarser in the Virgin, but he acknowledged that essentially the same design styles prevailed in both areas. He noted that continuing cultural interchange was demonstrated by trade ceramics and that, interestingly, most of the influence seems to have been from the Kayenta to the Virgin (Aikens 1966:55).

Aikens' observation on architectural variation during the Pueblo II period was essentially correct, although linear and "L" shaped roomblocks do occur on the Grand Staircase after about A.D.1100. Perhaps more important than the superficial trait of shape, is construction method and the history of site occupation: most Virgin roomblocks during the Pueblo II period are accretionally constructed one room at a time. This development over time infers the behavior of periodic abandonment and reoccupation alluded to earlier. For this reason curvilinear layouts are probably better explained as a functional attribute, rather than a stylistic one. Generally, "L" shaped roomblocks in the Kayenta may be constructed as single units. In the Virgin area they occur during late Pueblo II times and although "unit pueblos" have been recorded, those excavated to date have also been accretionally constructed - either room by room or in segments. This variation in roomblock construction and layout reflects basic differences in site occupational histories that have been taken to indicate Virgin adaption relied on residential mobility to a greater degree than did the Kayenta (McFadden 1996).

The most recent chronology for the area north of the Colorado River was written for the expanse of plateaus known as the Arizona Strip (Fairley 1989). Fairley's Class I overview was charged with making order of, from west to east: the Moapa/Virgin River lowlands, the St. George Basin, the Shivits Plateau, Unikaret Plateau, Kanab Plateau, Kaibab Plateau, Powell Plateau, House Rock Valley and the Paria Plateau. Few of these high density occupations had intensive work conducted on them and very few dates were available. Clearly, the areas in the west can be considered Virgin, while those east of Kanab Creek, are more similar to the Kayenta culture found south of the Colorado River. Adding to this complexity are late, and apparently intrusive, influences from the Kayenta heartland - perhaps the result of actual migrations. Attempting to deal with this spatial, temporal and artifactual/

architectural variation under the umbrella of a single chronology was a daunting task. Adding to the difficulties of interpretation was the lack of chronometric data for many of the areas. The resulting temporal framework for the Arizona Strip was excellent but necessarily general; it was based partly on chronometric information then available from the Virgin Anasazi region, and partly on the previously established temporal scheme for the Glen Canyon region (Jennings 1966; Lindsey et al. 1968) (Altschul and Fairley 1989:107).

The methods employed to describe the Arizona Strip temporal framework differs from those used in this chronology in two important ways: 1) Fairley relies on well-dated northern Kayenta ceramic analogs as the primary temporal diagnostic of the Formative Period for the Strip; and 2) architecture, site layout, construction method and style are not considered to be good temporal diagnostics. Fairley is emphatic on this point stating "the idea that each period is characterized by an amalgamation of specific cultural characteristics that changed in tandem from one period to the next is simply untenable" (Fairley 1989:106).

The Virgin chronology for the Grand Staircase relies primarily on the identification of local ceramic types that have been dated internally via radiocarbon dating or dendrochronology. The periods of time employed are derived from traditional usage of the Pecos Classification and may be considered local phases. While they are not intended to be developmental, a good case can be made for a continuous sequence of local adaptation that was interrupted only once about A.D.1070/1100 and which then quickly resumed its internal trajectory. In fact, architectural styles and layout on the Grand Staircase do correlate, for whatever reason, rather well with the diagnostic ceramic assemblages that define periods.

Emphatically, if the periods of a chronology are to be useful for ordering sites and artifacts in absolute time, the diagnostics that define them must be unambiguous. For example, defining Pueblo II (A.D. 1000-1150) as a period with ceramic types ranging from the simple assemblage of North Creek Gray Ware and St. George Black-on-gray, which defines Early Pueblo II on the Grand Staircase; to the various red ware, orange ware, white ware, and corrugated types that characterize the Late Pueblo II assemblage on the Staircase, is not a

useful framework. There is little utility in assigning diagnostics that cross-cut temporal periods; happily this has not been necessary for the Grand Staircase chronology presented here.

Recent Research Issues: Settlement, Subsistence, and Adaptation

Beyond chronology building, and some significant advances in our understanding of local ceramic types and their distribution (Lyneis 1998), there are several related issues around which most recent research interests have revolved: settlement patterns, subsistence practices, and their role in local adaptation.

Virgin Anasazi settlement and subsistence has been considered as simply an extension of the lifeways practiced in the Kayenta region (Euler 1994), as the result of local adaptation (Westfall 1987), and as organized by a specific adaptive strategy geared to the Grand Staircase environment (McFadden 1996): in each case, these practices are considered an integral part of Anasazi culture. The local Fremont manifestation in the study area has recently been considered as part of a "Fremont Complex" (Madsen and Simms 1998). This complex is said to reflect a mosaic of behaviors (by individuals) including "full-time farmers, full-time foragers, part-time farmer/foragers who seasonally switched modes of production, farmers who switched to full-time foraging, and foragers who switched to full-time farming" (Madsen and Simms 1998; 255). Spangler's (2000) recent consideration of the Terminal Archaic period (1000 B.C. to A.D. 600) projects this matrix of potential farmer-forager behaviors from the point in time when corn was introduced until well into Basketmaker III times. While the archeological record of the study area can't identify the behavior of individuals, it is capable of reflecting general strategies held by culturally defined social groups. The farmer-forager behavioral continuum clearly has merit in the Fremont area where a truly mixed economy persisted for centuries; on the Grand Staircase, a similar economy may have been practiced during Basketmaker II times, but rapidly evolved into a high degree of reliance on agriculture.

During the 1980's, a good deal of excavation work in the Virgin culture area was taking place in the St. George Basin (Dalley and McFadden 1985, 1988; Walling and Thompson et al. 1986;

Allison 1990) while at the same time the uplands were being subjected to intensive inventory. Virgin Anasazi sites in the St. George Basin are adapted to the extremes of the hot desert where low annual precipitation and high temperatures force virtually all farming oriented residential sites to be located along the perennial streams that drain into the basin. Excavations at several of these sites resulted in extremely low counts of wild floral and faunal resources that suggested a heavy dependence on horticulture (Dalley and McFadden 1988). Simultaneously, inventory in the uplands at Little Creek Mt. (Lyneis and Thompson 1979), the benches above the Virgin River, the Shinarump Cliffs, the Vermilion Cliffs, along Seaman Wash and Fin Little Washes (McFadden 1996) revealed high densities of residential sites occurring in the zone between 5,000 feet and 7,000 feet that was suitable for dry-farm agriculture. Inventories in the higher elevations produced numerous hunting and gathering oriented sites, but relatively few that could be attributed to the Anasazi. This considerable amount of survey data reinforced the interpretation that the Virgin Anasazi subsistence was largely dependent on agriculture.

An alternative view, based on data from other excavations, and inventory in other localities, suggested to their investigators that the Virgin Anasazi practiced a mixed economy (Allison 1990; Baker and Billat 1992; Westfall 1987; Fawcett 1994). There is no question that measuring the degree of dependence on agriculture and reconstructing subsistence practices is beset with difficulties; differences in excavation recovery methods, variation in preservation of bone, and proper classification of inventoried sites, are all potential sources of bias. A case can also be made that much of the apparent variation in the recovery of bone may simply be due to site location and proximity to big game range (McFadden 1999).

Martin has conducted the most comprehensive analysis of Virgin subsistence to date and argued that the Virgin Anasazi were full-time agriculturalists (Martin 1997). Using excavation data from different temporal periods he presents multiple lines of evidence from floral, faunal, and stable carbon isotope analyses to reconstruct Virgin diet. Martin's estimate, based on stable carbon isotope analysis, that 75% of Virgin caloric intake was from maize is a strong indication of the reliance

on agriculture. Ahlstrom (1999) recognizes the strength of isotope analysis to study diet over the long run, but points out that it masks potential short term variability in diet. Observing that 25% of the diet remains to be explained, he wonders whether wild resources were important enough to have a significant effect on Virgin adaptation (Ahlstrom 1999). At least part of the controversy over variation in subsistence practices appears to be semantic rather than substantive; the meanings of terms such as "mixed economy", "full-time farmers" "reliance on agriculture", "dependence on maize" etc. are vague and sometimes misleading. Future research into this domain would benefit from both a clearer definition of terms and a more explicit focus on what various data sets actually mean.

Settlement pattern studies on the Grand Staircase region have been an important research focus and source of data on demography, ecological relationships, and adaptation since the 1980's. Shifts in site density from one period to the next and even abandonment of large areas, indicate that the context for understanding culture change on the Monument should be regional rather than restricted to administrative boundaries. For example, a graph of inventory data from the eastern Grand Staircase section (Figure 6) shows a decrease in site density during the Pueblo I period and a concomitant rise in density to the west in the uplands above the Virgin River. This apparent demographic shift, from a lower elevation zone to higher one with more effective moisture, correlates with changes in

effective moisture on the Colorado Plateau (Figure 7) that occurred about the same time (Plog et al. 1988). This suggests that climate change may have played a significant role in settlement patterning.

Another paleoenvironmental factor that may have had a significant effect on prehistoric settlement patterns is the alluvial history of the major drainages that dissect the cliffines and traverse the broad terraces of the Grand Staircase physiographic section. High densities of agriculturally oriented residential sites lie along these intermittent washes and their tributaries. Episodes of down-cutting and subsequent refilling with sediments undoubtedly affected the potential for agriculture in these areas. Existing inventories of sites with good temporal control (Figure 6) suggest that population density may have risen and fallen in tandem with these events. Joint geomorphologic and archeological investigations offer the opportunity to link these episodes of cut and fill with local climate phenomena, agricultural practices, or possibly a relationship with global weather patterns (Webb et al. 1991).

Spatial Terminology

As Latady and Fawcett (1997) have recently pointed out, with particular regard to the GSENM, all archaeological inventory is subject to bias. The temporal and spatial data used to infer settlement patterns on the Grand Staircase has been drawn from both structured research methodologies (Heid 1982; Wise 1986) as well as from widespread compliance survey and nonrandom inventories

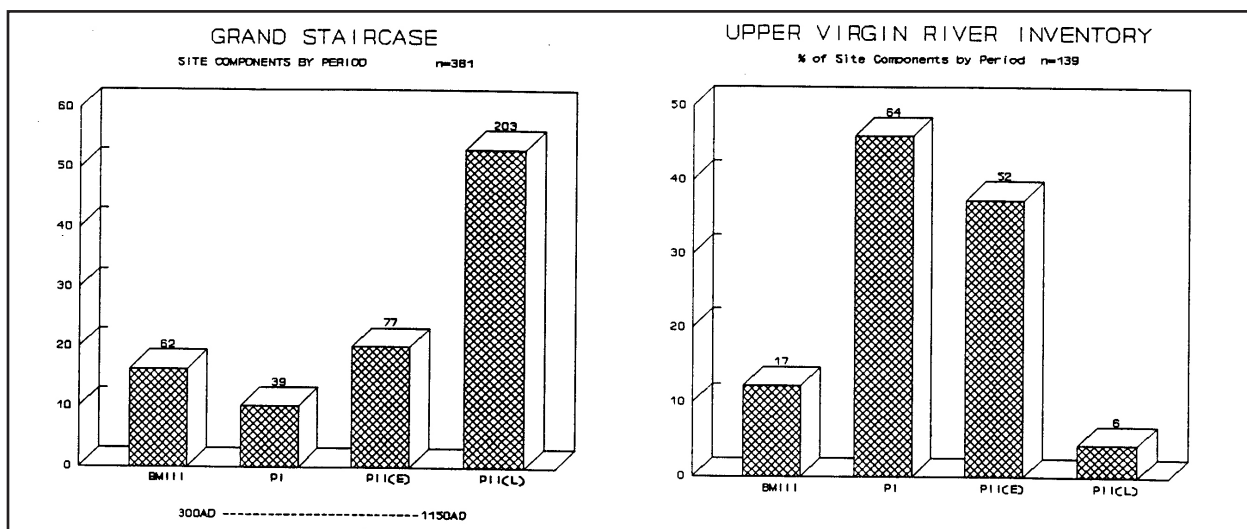


Figure 6. Histograms of site components.

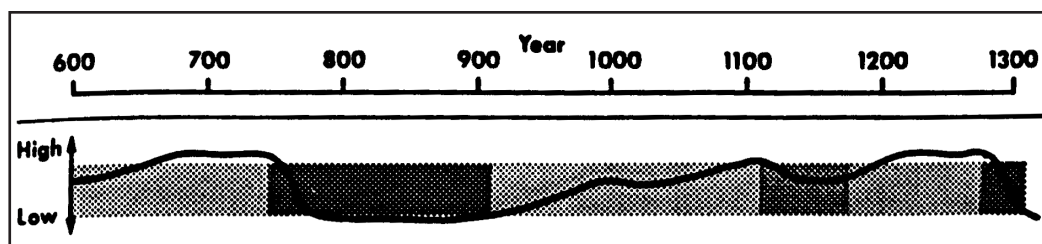


Figure 7. Graph of effective moisture on the Colorado Plateau (after Plog et al. 1988).

(McFadden 1993, 1996). Based on an analogy of long-fallow systems in prehistoric southwestern New Mexico (Nelson and Anyon 1996), Latady and Fawcett point out that prehistoric use patterns on the Monument may have involved areas as large as 3,600 square miles. In fact, the Grand Staircase physiographic section is very close to that size; although the GSENM encompasses only the eastern third, the Grand Staircase provides a logical unit of analysis for the purposes of this study.

The most commonly used map of the Virgin region is provided by Aikens (1966:2). It covers all three of the diverse cultural/geographic units that structure this volume. His view apparently placed more weight on ceramic similarities rather than architectural variation between the areas. More recently, others too have pointed out that ceramics on the Kaiparowits are most similar with Virgin pottery to the west - a conclusion agreed with here, but one which leaves open the question of why the architecture of Fifymile Mountain is so different from that on the Grand Staircase (Geib et al. 2001).

Since Aikens' initial definition of the Virgin region, boundaries have expanded and contracted according to the perspective of the researcher. Thompson (1978) suggested dropping the term Virgin altogether and using the geographically inclusive and culturally neutral term "Western Anasazi" to include all of these areas. This was objected to, partially on the grounds that the term was already in use (Fairley 1989), but also because the Virgin cultural manifestations are generally viewed as spatially discrete making the term useful. Robert Euler, expressing a view paralleling Madsen's perspective on Fremont variants, suggested "Certainly by now it should be clear that any attempt to rigidly draw fixed boundaries between the Kayenta and Virgin Anasazi is an exercise in futility and in reality not intellectually productive" (Euler 1994:101).

The Virgin region has been subdivided in a variety of ways to meet the needs of the researcher: as environmentally defined areas; the Lowlands, the St. George Basin, and the Plateaus (Lyneis 1995:202). In his discussion of Virgin architecture Talbot (1990) makes a two-fold distinction of "Lower Virgin" for the Nevada manifestation and "Upper Virgin" for both the St. George Basin and plateau areas. Recently, even smaller geographic localities, representing local adaptations within the region have been considered useful analytical units (McFadden 1993). The Grand Staircase is one such unit. Although both the number of sites dated, and the number of dates available, on the Grand Staircase are relatively few when compared to other areas of the Southwest, the sites extend across the length and breadth of the physiographic section and all periods are represented (Figure 8).

The perspective taken here is that the consistency and continuity of material culture on the Grand Staircase section, spanning over 12 centuries, and ranging east-west across 70 miles of southern Utah, is a logical unit of analysis for developing a Virgin chronological framework. GSENM, which encompasses a considerable portion of the eastern Grand Staircase physiographic section, displays sites spanning Basketmaker II - Pueblo III times with material culture that is very similar to that on sites extending to the west. Differences do occur however: Shinarump series ceramics appear to be a local innovation originating during Basketmaker III and growing in popularity through time; the historic influence of the so-called Pueblo II expansion indicates a Kayenta influence of greater magnitude than was felt further west. Local adaptation and varying historic influences aside, the common culture and environment of the Grand Staircase as a whole provides the most logical context for considering a chronological framework on the GSENM.

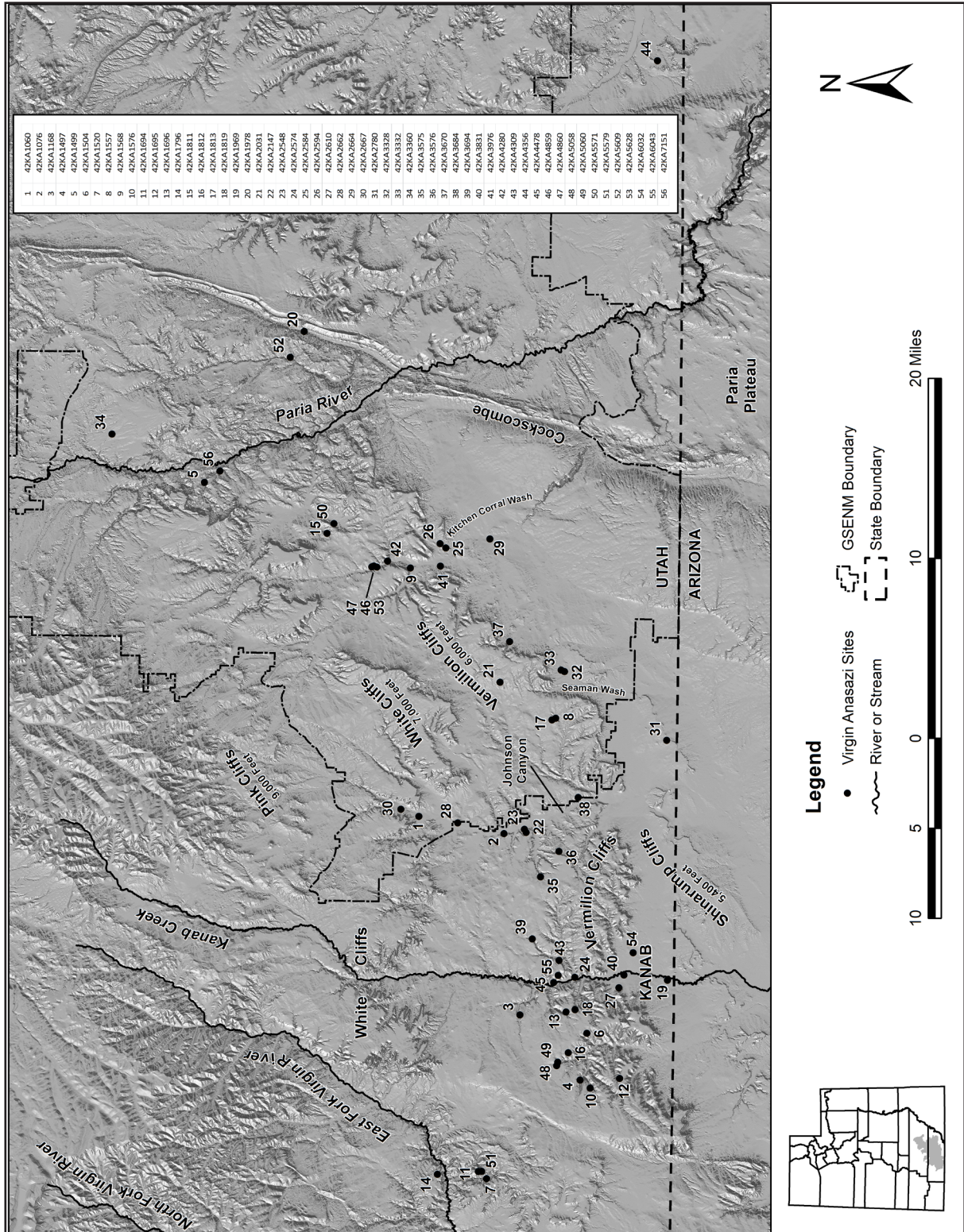


Figure 8. Map of Virgin Anasazi sites discussed in the text.

ARCHAIC-FORMATIVE TRANSITION SITE DESCRIPTIONS

42Ka4476, Broken Arrow Cave (Talbot et al. 1999)

This site was recorded during an inventory in support of a proposal to exchange public lands for private lands. Approximately 40% of this large, deep cave was determined by the Bureau of Land Management cadastral survey to be located within lands administered by the Kanab Field Office, the remaining portion is private land. The cave was tested and reported on by Brigham Young University who conducted the excavations under a cooperative agreement with the Grand Staircase-Escalante National Monument. Eventually the exchange proposal was dropped and in December 1998 the tract on which the site is located was transferred to the State of Utah.

Broken Arrow Cave (Figure 9) (so named because a movie by that name was filmed nearby) holds deep, sandy, stratified deposits on a very steep slope. The lower deposit suggests an initial occupation during the early Archaic about 6,000 B.C. (Table 1). A Basketmaker Period date of A.D. 343-669 (2 sigma) with a calibrated midpoint of A.D. 542 (Beta 111639) was obtained from the uppermost level. Intermediate deposits occur that potentially date to the mid, late, and transitional Archaic periods were not dated. The charcoal from which the dates were derived was all identified as being from short-lived plants i.e. sagebrush, saltbrush and rabbitbrush.

Deep and well protected, the cave has southeast aspect, suitable for cool season occupation. It is located within the Wahweap Creek drainage which heads on the Kaiparowits Plateau about 35 miles to the northwest. Ten miles downstream Wahweap Creek enters the channel of the Colorado River. The

site's physiographic location places it immediately north of the Paria Plateau on the eastern margin of East Clark Bench. Its elevation at 4,080 feet situates it within the modern Blackbrush community of the Lower Sonoran zone; deep sand cover encourages extensive cool season grasses.

Four test trenches revealed deposits consisting of thick beds of organic debris, presumably the result of processing various types of vegetation. Preservation of organic material, including sandals, yucca knots and cordage was excellent. Coprolites are numerous and provide the potential for data on subsistence and prehistoric diet.

Milling stones are the most common surface artifact on site. In combination with quantities of seed from goosefoot, ricegrass, dropseed and a host of other plants, the occupants of Broken Arrow appear to have used the cave on a seasonal basis as a base for gathering and processing edible seeds. Coprolite analysis was undertaken and will be reported separately.

Temporally sensitive chipped stone tools included 4 Elko Series points and one possible Northern Side-notched point. Elko points have a temporal range equal to the span of radiocarbon dates from the site. Barrier Canyon rock art styles (Figure 10) and apparent Glen Canyon Linear style sheep suggest the cave was used during the Mid/Late Archaic period.

Testing revealed that the sandy, stratified deposits bracketed by the lower, early Archaic deposit and the uppermost Basketmaker level, held numerous undated occupation surfaces with shallow basin-shaped hearths. These deposits are over one meter deep and at least have the potential to represent the late Archaic and transitional periods.



Figure 9. 42 Ka4356, Broken Arrow Cave (drawn by M. Graffam).

Beta Sample No.	Provenience	Material	Conventional C14 Age BP	2 Sigma Calibrated Range	1 Sigma Highest Prob. Range	Curve Intercept**
111634	F23 in F15	charcoal	2000±70	BC 195-AD 131	BC 90-AD 78	AD 11**
111635	F55 in F50	charcoal	6640±80*	BC 5714-5472	BC 5623-5493	BC 5586**
111636	F53 in F50	charcoal	6660±80	BC 5721-5475	BC 5635-5517	BC 5587**
111637	F26 in F15	charcoal	7290±70	BC 6331-6008	BC 6218-6078	BC 6157**
111638	F16 in F9	plant material	6700±80	BC 5731-5480	BC 5704-5538	BC 5623
111639	F10/14 in F9	charcoal	1520±90*	AD 343-669	AD 438-608	AD 542

* AMS date; all others standard radiometric dates.
 ** Multiple curve intercepts averaged.

Table 1. 42Ka4356, Radiocarbon Dates from Broken Arrow Cave Test Units (Talbot et al. 1999).

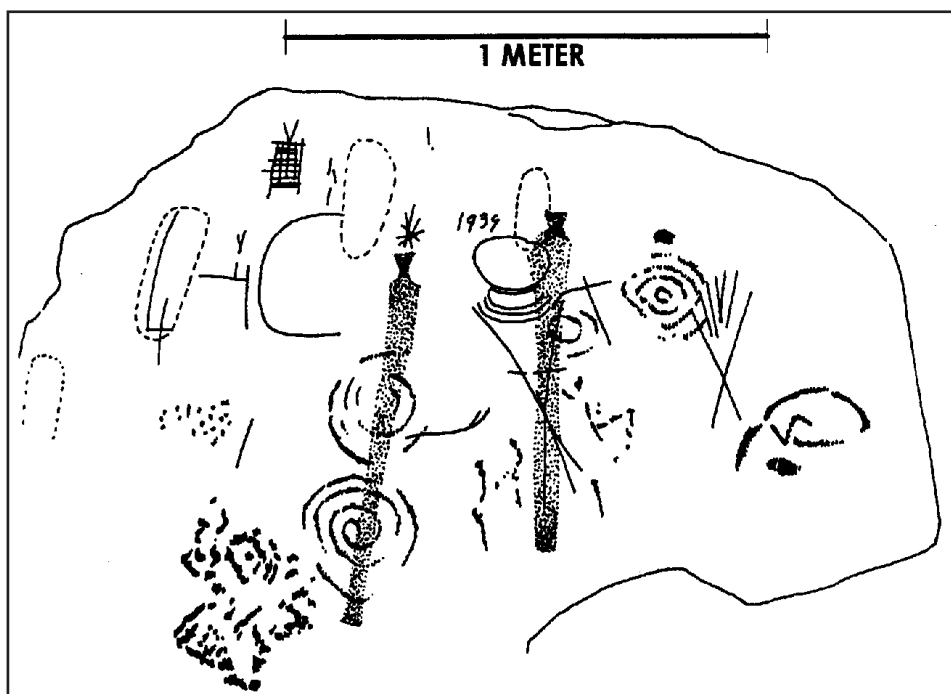


Figure 10. 42 Ka4356, Barrier Canyon style petroglyphs (drawn by M. Graffam).

**AZ A: 3: 20 BLM, Rock Canyon Shelter
(Janetski and Wilde 1989)**

This dry shelter occurs near the edge of the Uinkaret Plateau in a steep canyon that cuts through the Hurricane Cliffs and drains into the St. George Basin. Limited testing by Brigham Young University, at the behest of the Arizona Strip District BLM, recovered abundant macrobotanical materials including 42 taxa of wild species, as well as maize. Although the site lies in a non-arable setting, BMII pithouses are reported a short distance upstream (Naylor 1996). The site's faunal record includes deer and bighorn sheep in the lower deposits which suggested to the excavators that the shelter was used as a hunting station during the Archaic period. In contrast, the upper deposits which dated to the Basketmaker and Pueblo occupations, held more cottontail and jack rabbit bone than artiodactyl. In addition the remnants of a possible cist were identified.

A stratigraphic sequence with six radiocarbon dates from charcoal indicated Middle Archaic, Late Archaic, Basketmaker, and Pueblo I occupations (Table 2). The authors point out that "Corn remains were found in good association with dates A-C." The earliest date, cal B.C.204-A.D.119 (Beta-14604), is coeval with directly dated maize from BMII sites elsewhere in the Virgin region. Deposits lying beneath the BMII level produced a Late Archaic date of B.C.1260-916 (Beta 14600) narrowing the gap between the Archaic and Formative periods to 1,000 years or less.

**NA5507, Antelope Cave
(Janetski and Hall 1983;
Janetski and Wilde 1989)**

Brigham Young University mounted the most recent of several investigations at this large, deep cave on the Arizona Strip at the request of the Arizona Strip District, BLM. The cave is a "solution and collapse structure" formed in the upper portion of the Kaibab Limestone (Maxfield 1983). It measures 40 meters deep and about 60 meters wide. It is located on the Uinkaret Plateau about 24 miles east of the Hurricane Cliffs. Its elevation, at about 4,600 feet, places it in a marginal environment with regard to precipitation and maize farming although La Mar Lindsey's, pollen analysis suggested a nearby riparian resource. Formal features such as cists have not been encountered suggesting to the authors that the site, like Rock Canyon Shelter, functioned as logistical base/cache rather than an agricultural station. Numerous residential sites ranging from BMII-PIII occur to the north on Little Creek Mountain. The authors point out that the site may have been related to movement along Clayhole Wash which heads to the south near Mt. Trumbull.

Although the site was badly looted as early as 1949, surface collections and test trenching yielded nearly 4,000 artifacts (Janetski and Hall 1983). Material culture items included chipped stone, ground stone, textiles, an atlatl, and both faunal and plant remains (Janetski and Hall 1983). Pollen and coprolite samples were examined and reported by Lindsay (1983). Domesticated plants including

Laboratory Number	Radiocarbon Age	Calibrated Range	Sigma	*Probability
A Beta 14602	1270+/-60 B.P.	A.D. 668-794	1	1.00
B Beta 14603	2020+/-60 B.P.	B.C. 105-A.D. 28	1	0.96
C Beta 14604	2030+/-70 B.P.	B.C. 204-A.D. 119	2	0.99
D Beta 14600	2880+/-60 B.P.	B.C. 1260-916	2	1.00
E Beta 14599	3310+/-60 B.P.	B.C. 1742-1495	2	0.97
F Beta 14601	4130+/-70 B.P.	B.C. 2896-2570	2	0.96
* Probability of target date falling within range shown				

Table 2. Radiocarbon dates from Rock Canyon Shelter (AZ A:3:20 BLM) (Reported in Janetski and Wilde 1989).

corn, beans and squash were recovered, in addition to a range of foraged species.

Projectile points collected from the deposits generally reflect the periods of occupation. Two of the dart points depicted are suggestive of late Archaic Gypsum styles (Janetski and Wilde 1989: Figure 7, a, b).

Antelope Cave yielded three late Archaic dates, taken on charcoal, from lower deposits associated with late Archaic artifacts (Table 3). The dates are comparable to both the Arroyo site Archaic level, which functioned as a temporary residence, and Rock Canyon Shelter which, like Antelope, also appears to have been a logistical waypoint. In an addendum, Janetski and Hall report a date obtained from a portion of an atlatl from the cave. The artifact yielded a date of 1850 $\pm$ 60 B.P. or A.D. 100 $\pm$ 60 (Janetski and Hall 1983).

42Ka2574, Hog Canyon Dune (Scheisman and Neilson 1988)

This is a multicomponent Archaic/BMII-BMIII site located at the confluence of Hog Canyon and Kanab Creek immediately north of the city of Kanab. Excavations in the dune were limited on the east by waterline trench which exposed a BMIII pithouse (reviewed in the BM III descriptions) and Highway 89 on the west. The earliest identified features on site are a cluster of six formal features including two burials and four hearths generally associated with Occupation Level A. Only a generalized contact between overlying midden and a use surface was defined. As a result, the features were considered "relatively contemporaneous." Perhaps significantly, the overlying midden, averaging 1 meter thick, was also an aceramic deposit.

Burial 2, the lowest feature, was dated at 2 sigma 890 to 385 B.C. (Beta 8782) with a calibrated intercept of 775 B.C. Of particular interest is the association of a single corn kernel with this apparent late Archaic burial. In addition, two kernels were associated with Burial 1 as well as 2 kernels in Hearth 4. Because only a single corn kernel was found with the charcoal dated burial, some question remains about its true association. Both the association with maize and its importance to the individuals diet could be resolved with stable isotope analysis.

Hearth 1 carbon yielded a BMII date of A.D. 75-645 (Beta 8781). Regardless of its association with maize, the Burial 2 date is of interest because it occurs during the terminal Archaic period in an area heavily occupied during BMII times.

A possible structural feature, suggested by a large diameter circular soil contact was noted during Thompson's initial testing. Schleisman and Nielson describe an ash/jacal, deposit in the same general area. A purportedly aceramic pithouse was excavated nearby on private land after the formal excavations were completed. Clearly, the limited nature of the excavations precluded a full understanding of the site.

42Ka3976, The Arroyo Site, Archaic level

The Archaic component of the Arroyo site was buried over a meter deep and was defined in profile only (McFadden 2000a). A dish shaped and compacted surface with a thin lens of charcoal scattered over it was exposed in the opposing walls of a wash that cut through the structure (see Figures 101, 102). Investigations of this feature were restricted to drawing profiles, pollen sampling,

Laboratory Number	Radiocarbon Age	Calibrated Range	Sigma	*Probability
A Beta 24432	3290 $\pm$ 60 B.P.	B.C. 1699-1444	2	0.98
B Beta 24432	3490 $\pm$ 60 B.P.	B.C. 1891-1744	1	1.00
C Beta 24433	3590 $\pm$ 50 B.P.	B.C. 2028-1893	1	1.00
<i>* Probability of target date falling within range shown</i>				

Table 3. Radiocarbon dates from Antelope Cave (NA 5507) (Reported in Janetski and Wilde 1989).

extracting charcoal from profiles for dating, and collecting a slab milling stone that lay directly on the floor surface. In addition to the light scatter of charcoal, a small fragment of daub from the floor suggests a lightly constructed, wattle and daub superstructure. Small charcoal fragments from the surface on the west, where the milling slab was exposed, yielded a 2 sigma date of B.C. 1880 to 1450 with a calibrated midpoint of 1660 B.C. (Beta 77109). On the opposite side, a slight depression in the floor, interpreted as a hearth, yielded charcoal dating B.C. 1935 to 1505 with a calibrated midpoint of 1705 B.C. (Beta 77118). Together, the dates offer strong evidence for occupation of the site near the beginning of the Late Archaic Period.

Samples collected from the floor surfaces exhibited a pollen record different from the overlying Anasazi samples. The Archaic record was dominated by *Artemisia* and quantities of *Pinus* and *Juniperus* pollen that were generally smaller than those noted in the Anasazi samples. A very small quantity of *Zea mays* pollen, as well as maize starch, was noted and assumed to be the result of bioturbation or downward migration from the Anasazi midden (Cummings 1995). A review of the features proximity to overlying Puebloan deposits makes this probable. Presumably, similar faunal resources were present during the Late Archaic as during the Formative. Quantities of mule deer, pronghorn and big horn sheep bone were found in abundance in the Puebloan deposits at Arroyo; big game resources of some type were also likely available during the Archaic period. The presence of a small quantity of cattail pollen (*Typha* sp.), common on many Formative period sites, comments on the environmental setting and a potentially significant food resource.

Although no projectile points were recovered from the Archaic level at Arroyo, Late Archaic Gypsum points, a diagnostic of the period, are relatively abundant and widely distributed across the Monument. Gypsum Points are common on the Grand Staircase (Keller 1987), on the Kaiparowits Plateau (Geib et al. 1999:5-32; Kearns 1982), the Escalante drainage (Hauck 1979) the Circle Cliffs (Tipps 1988), as well as the lower Glen Canyon Benches (Geib 1989) and the Arizona Strip (Altschul and Fairley (1989). An assemblage of Gypsum points, said to have been collected on public lands, was eventually returned to the Kanab

Resource Area, BLM (Figure 11).

Most, if not all, of these points were said to have been found cached on the bench between the Vermilion and White Cliffs about five miles north of the Arroyo site. All but one of the eight identifiable points were made of Petrified Forest Member Chinle chert which originates at the base of the Vermilion Cliffs. The eighth point appears to be Kaibab chert which is found to the south along the Utah-Arizona border.

Of significance for addressing the question of Archaic-Formative continuity on the Grand Staircase is the occurrence of Gypsum points during the Formative Period. Five Gypsum points (Figure 14) were recently recovered from "secure Basketmaker II proveniences" at the Reservoir Site (Eccles and Walling-Frank 1998:10.25). Apparently, there is the very real possibility that the temporal range for Gypsum dart points on the Grand Staircase extends from the late Archaic into the Formative Period.

42Ka5060 (Judd 1926:122)

Judd (1926:122) describes this pictograph located in upper Cottonwood Canyon as "an incomplete Basket Maker drawing, one of the finest and brightest of all those seen in this vicinity." Judd documented a range of Basketmaker, Pueblo I/II, and Late Pueblo II pictographs in the canyon, this panel stands out as unique among them (Figure 12). Schaafsma noted its resemblance to Barrier Canyon style (Schaafsma 1971:112). Related styles in the lower Kanab Creek drainage, the Grand Canyon (Christensen et al. 2013) and the Escalante Drainage (Kanab BLM site files) support a wide distribution of the type.

Recorded in greater detail in 2000, Judd's sketch is actually part of a much more extensive panel that can be segregated into at least two style clusters: on the north end of the shelter are simple, round shouldered "doughboy" anthropomorphs, Cave Valley style figures, zig zag lines, and "tally marks" that associate with Basket Maker and Pueblo I sites in this volume; on the south, including a very restricted crevice, are series of polychrome figures including Judd's sketch.

Judd's central figure is white and outlined in black, about 60cm high and flanked by purple

and red images. Other anthropomorphic torsos are painted in red and purple; more abstract linear images are orange. A possible rectangular torso, measuring 60cm x24cm, is painted orange with black framing lines and purple or red linear lines within the body (Figure 13).

As Judd noted, there are no associated artifacts or features with which to date the site. Direct dating of pigments containing carbon has, however, been conducted on Barrier Canyon pictographs in Canyonlands National Park . Radiocarbon and AMS dates there fall between 1900 B.C. and A.D. 300 (Tipps 1995:168).

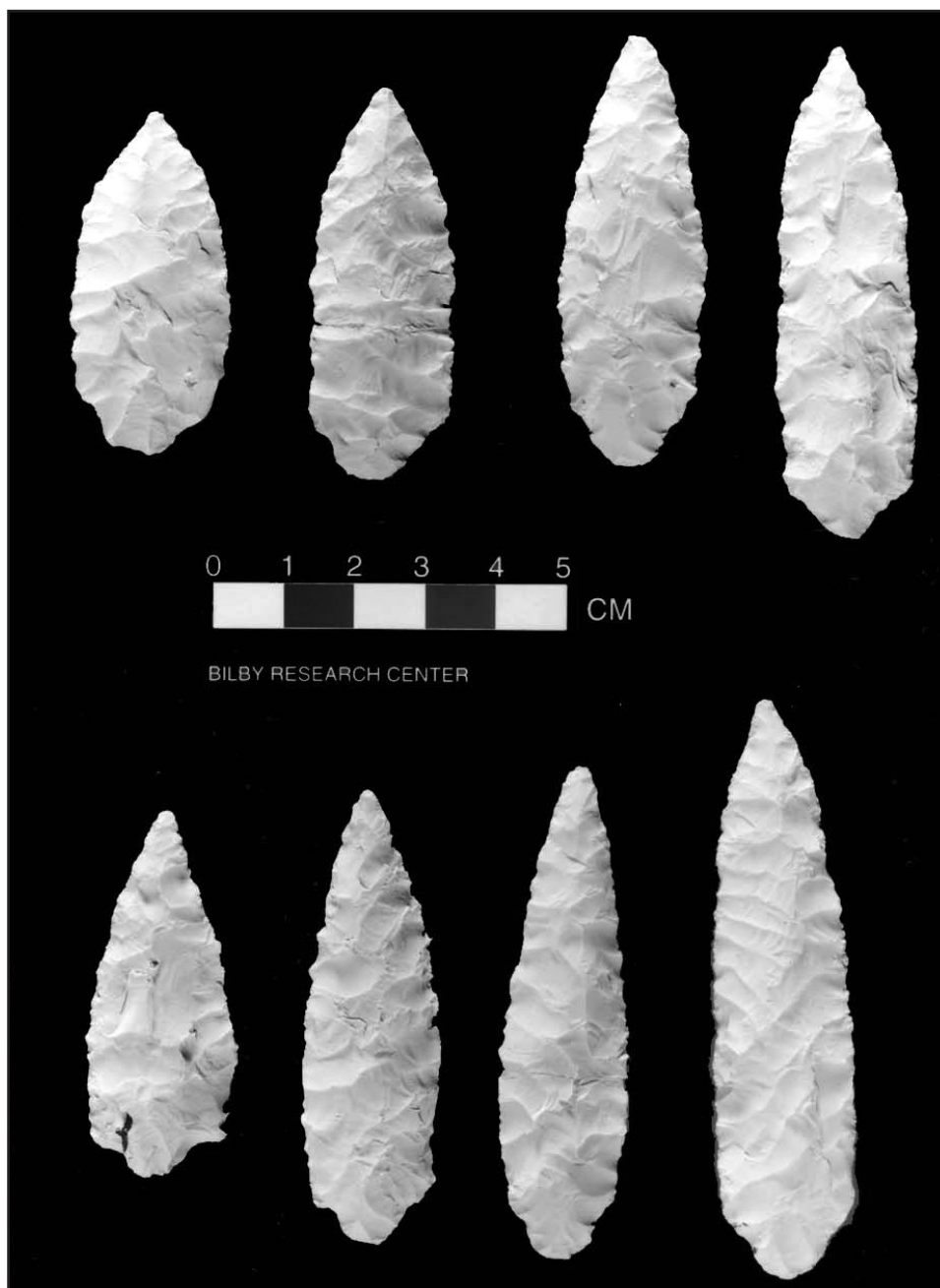


Figure 11. Gypsum Points from the Grand Staircase.

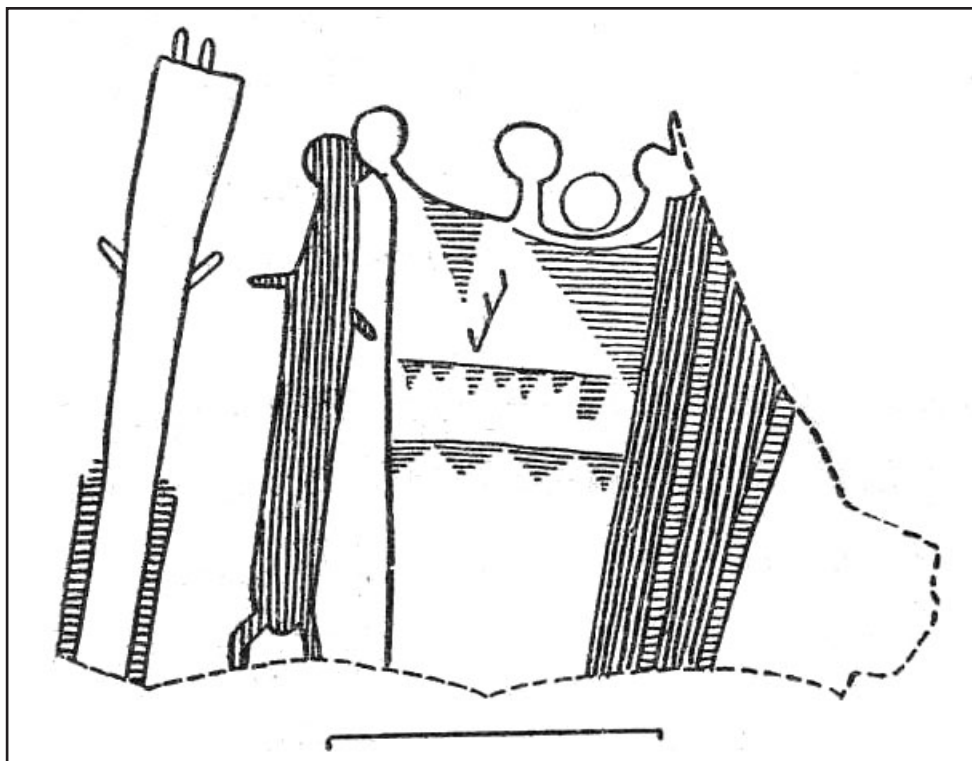


Figure 12. Pictograph panel in Cottonwood Canyon (after Judd 1926); 42Ka5060.

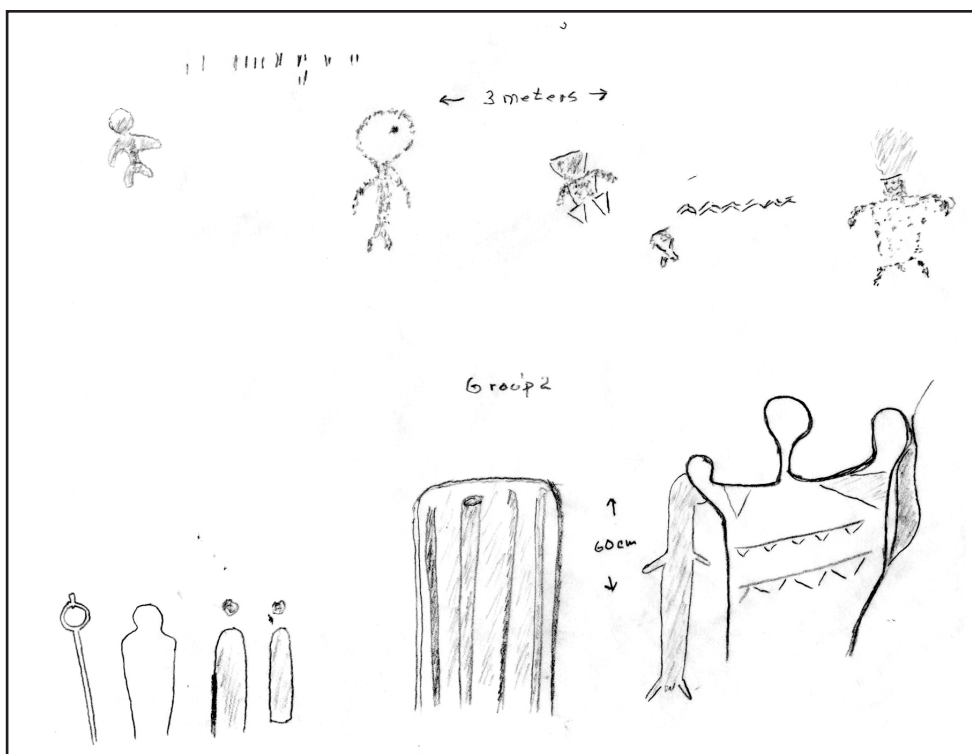


Figure 13. 42Ka5060 pictographs.

BASKETMAKER II SITE DESCRIPTIONS

AZ B:1:5(BLM), Carling Reservoir Site (Walling-Frank 1998)

The Carling Reservoir site is located south of Colorado City, Arizona near the base of the Vermilion Cliffs at an elevation of about 5,000 feet. It lies less than a mile from Short Creek the areas main drainage. Tested by Richard Thompson in 1986, it was excavated in 1988 and 1989 by Walling-Frank and is reported in Nielson (editor, 1998). Although a small Pueblo I and Late Pueblo II/III component was also excavated, the primary occupation was represented by a cluster of aceramic pithouses.

Eleven pit structures were identified as part of the Basketmaker II occupation. Stratigraphic and dating evidence suggested to Walling-Frank that three, possibly more occupational episodes were represented. Generally in an excellent state of preservation, these structures were remarkably varied in form, size and construction detail. Three radiocarbon dates from pithouses place the site in the first 3 or 4 centuries A.D. - two on wood from pithouse fill (PH 11, PH 5) have the greatest time span, and are potentially the latest; a date from the hearth of PH5 is potentially the earliest with an overall 2 sigma range of A.D. 24-311.

Storage was represented by eight slab-lined features that were associated with the pithouses in various ways. Four were roughly constructed, shallow, small volume features: three of which were in the fill of pithouses (1, 2, 3) allowing placement late in the sequence; one (Storage Unit 4) was associated with a roast. These features are somewhat anomalous in terms of location, size and construction and do not seem to represent serious, long term storage of surplus.

Storage Units 5-8 are sizable, deep, slab-lined cists said to be typical of Basketmaker II that might represent a "fair representation of the ratio between storage and habitation features (Walling-Frank 1998:6.89)." Determining the available storage volume at any given time is conjectural because of the difficulty determining whether the storage

units and all 11 cists were in use at the same time - although the author does propose 3 occupational episodes for the pithouses. Assuming that storage cists are more durable, subject to repair as necessary, and eventually were all in use at the same time, the storage volume/habitation ratios compare well with farmstead sites during the puebloan periods (Table 25).

One of the pit structures stands out from both the storage features and pit houses: Pit Structure 5, although "poorly preserved" and apparently rebuilt, did not have a hearth, was slab-lined and had no evidence of roof supports or a bench. Comparison with the other pithouses was said to be "tenuous." The plan map (Figure 6.12) shows a considerable amount of tabular rock and clay construction materials not inconsistent with its possible function as a (very) large volume storage feature. Direct evidence for the contents of the cist is minimal. Walling-Frank describes a wide range of burned wild seed as well as maize and Cheno-Ams from Storage Unit 7 and a pollen sample from unit 5 dominated by Cheno-Ams. The combined evidence of architecture and domestic and related seed is taken as evidence for a high degree of reliance on agriculture.

Eight of fourteen dart points on the Reservoir site are morphologically similar to Gypsum dart points. Five of the eight were said to be recovered from good Basketmaker contexts (Figure 14). Other types identified included Elko Side-Notched and a Basketmaker side notched specimen.

Gypsum points span the late Archaic (Holmer 1980:83) and are ubiquitous on both Grand Staircase as well as on the Arizona Strip (Altschult and Fairley 1989). The widespread distribution of these points during the late Archaic, and their occurrence during the Formative Period offers support for an indigenous Archaic base for the Virgin Anasazi Basketmaker. Gypsum projectile points offer a line of evidence for investigating a continuous local sequence from Late Archaic times into the Formative.

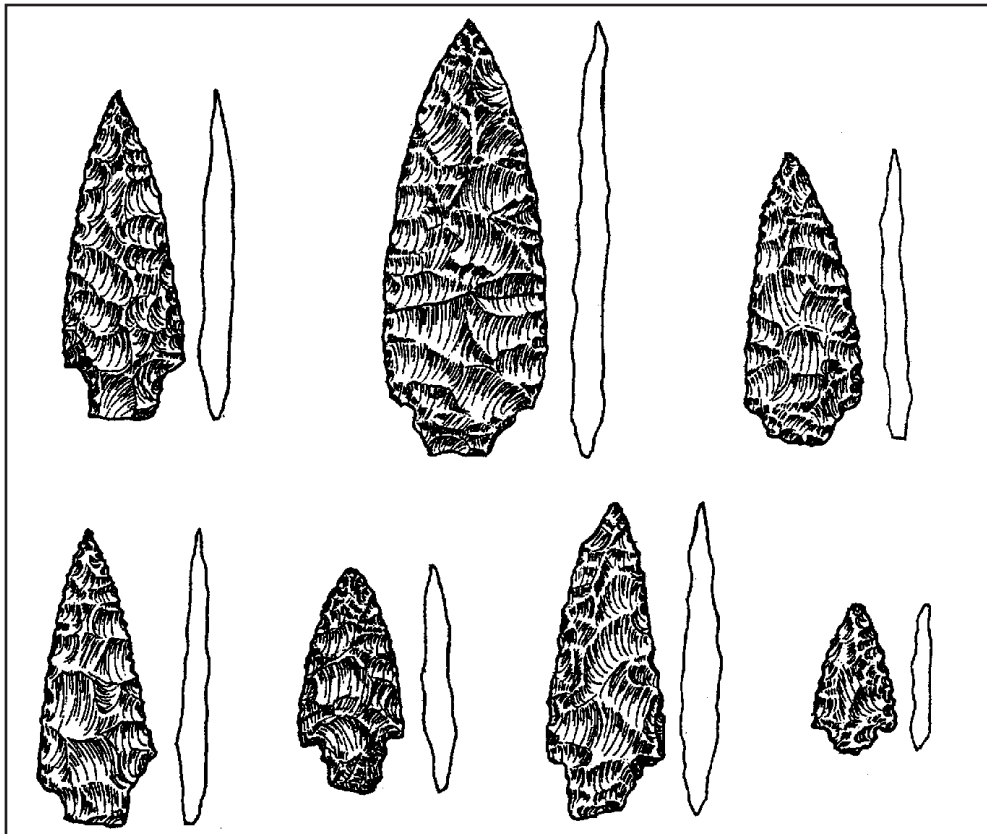


Figure 14. Gypsum Dart Points, Reservoir site (After Eccles and Walling-Frank 1998).

Laboratory Number	Prov.	C14 Age	2 Sigma Range	Material
Beta 33810	PH 12, Fill	1250+/-80	AD 658-899 903-964	Wood
Beta 33811	PH 11, Fill	1730+/-60	AD 145-433	Wood
Beta 33812	PH 13, Fill	670+/-90	AD 1207-1437	Wood
Beta 33813	PH 5, Fill	1820+/-60	AD 79-348 356-375	Wood
Beta 33816	PH 8, Hearth	1880+/-50	AD 24-48 51-250 308-311	Charcoal

Table 4. Radiocarbon dates from AZ B: 1: 35 (BLM), the Reservoir site (Billat 1998).

Grand Canyon-663, The Little Jug Site (Thompson and Thompson 1974)

The Little Jug Site is a complex pithouse village with storage facilities that was partially excavated by Richard Thompson of Southern Utah State College in 1974 (Thompson and Thompson 1974). The site represents the early end of a lengthy sequence in a locality north of the Grand Canyon inventoried by Thompson (Table 5).

The Little Jug site provided the first Basketmaker II age radiocarbon dates in the uplands of the Virgin culture area. Berry (1984) accepted these dates as evidence for the presence of simple plain gray ceramics during Basketmaker times (Table 5). Talbot (1998) provides a good description of the site based on the Thompson's manuscripts and a reconsideration of the dates. Given the possibility of dates from "old wood" he suggests a date of ca. A.D.400 is most appropriate for the site. A reexamination of the Little Jug ceramics would be worth the effort to determine if they are similar to the polished brownware, c.f. Obilisk Grayware, found found at 42Ka1796.

42Ka1576, South Fork Indian Canyon Alcove

This north aspect, aceramic alcove is situated well above the floor of a tributary to Cottonwood Canyon west of Kanab. Neil Judd (1926) first investigated this canyon system in 1915 but apparently did not visit the site. The sandy deposits of the alcove were badly looted after its discovery in 1965. Based on information provided by a local

informant, it once held multiple slab-lined cists.

In 1988 BLM archaeologists collected 17 pinyon and juniper timber specimens, scattered among tabular sandstone, from the surface after another episode of looting. The timbers were consistently about one meter in length and were probably the roof beams and cribbing of storage cists similar to those at Cave du Pont (Nusbaum,1922;56). Residential use of the site seems unlikely given its north aspect (common for Basketmaker II alcove storage sites), but remains a possibility. Perishable material is fairly abundant indicating at least short-term occupation at the site. Corn cobs on the surface of the site ranged from 10 to 16 row, similar to those at Cave du Pont located 10 kilometers to the southwest (Figure 15). Both Cave du Pont and South Fork are located in similar perennially wet, canyon environments. Unlike Cave du Pont, no human remains have been identified in the deposits.

A large and complex pictograph panel illustrates an impressive example of rock art associated with the occupation. A wide range of anthropomorphic styles are represented, some portrayed in multiples of two or three, others in a series of up to ten figures. Headdresses and ear appointments are represented but more common is a rather pedestrian, doughboy-like figure, also found at Cave du Pont and other locations in the upper Kanab Creek drainage. What is not represented is the distinctive Cave Valley anthropomorph which is common on nearby early ceramic bearing sites.

A dozen or so small "cupules," pecked depressions several cm wide and a few deep, occur on the sloped surface of a large boulder at the

Laboratory Number	Date (B.P.)	Date (A.D.)	2 Sigma Range*	Calibrated
RL340	1630+/-90	AD 320	234-630	423
RL336	1690+/-100	AD 260	124-601	389
RL335	1720+/-100	AD 230	83-555	341
RL337	1750+/-100	AD 200	71-542	291
RL338	1810+/-100	AD 140	5-433	235
RL339	1850+/-90	AD 100	32BC-AD407	168
* calibrations are from Talbot 1998, Table 8.1				

Table 5. Radiocarbon dates from GC-663, The Little Jug site (Thompson and Thompson 1974, as reported in Berry 1984).

back of the shelter. These features are common in sheltered sites with early occupations. Their function is unknown but they seem purposeful.

A radiocarbon assay taken from the exterior rings of a structural timber yielded a date of A.D. 120-630 (RL-2086) with a calibrated midpoint date of A.D. 405. At the time (1988), this was the earliest maize associated date on the Grand Staircase - although A.D.405 is probably closer to the terminal date of the Basketmaker II Period than its beginning. Good quality tree-ring dates of 81 B.C. (++vv), 3 B.C. (++rGB) and A.D.5 (++GB) were eventually obtained from the timbers in 1992

owing to "a breakthrough with the Mammoth Creek chronology" (personal communication William J. Robinson 6/25/92).

The disparity between the radiocarbon date and the early tree-ring dates raised the question of whether the purported cists actually held maize. This prompted the direct dating of a corn cob in the hope of demonstrating the temporal association of the cists and maize. A cob, collected from the surface after the looting episode, yielded a date of A.D. 350-635 at a 95% level of probability with midpoints of A.D. 465,480 and 520 (Beta 128986). This date is consistent with the C14 dated timber but was

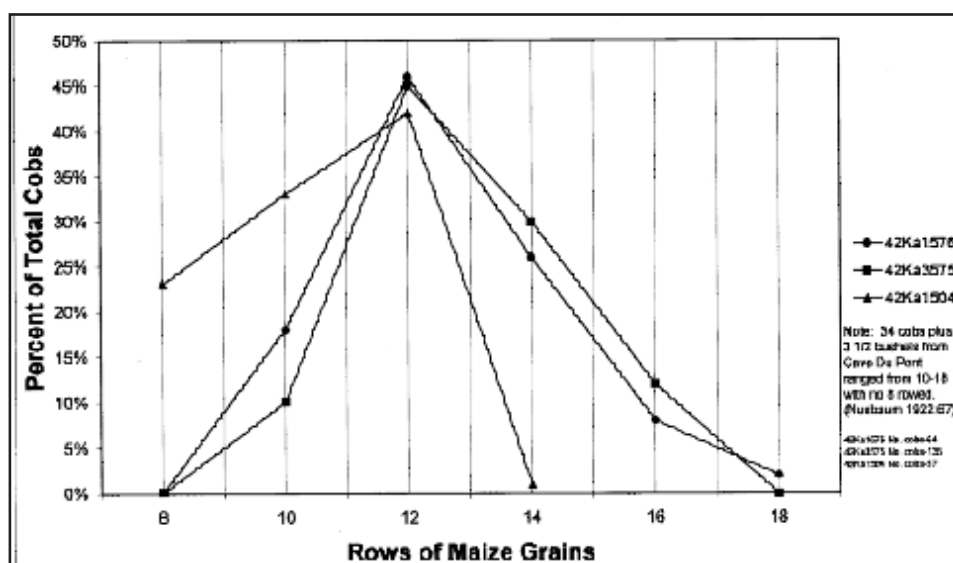


Figure 15. Graph of maize row counts from selected sites.

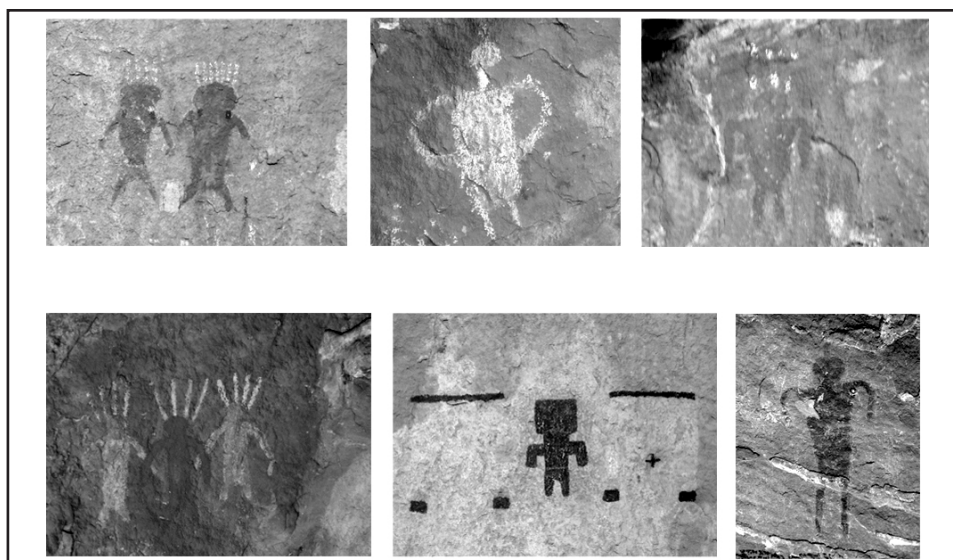


Figure 16. 42Ka1576, South Fork Indian Canyon Pictographs. Cave du Pont figure in red, lower right.

disappointing because it was not as early as the tree-ring dates. It does suggest, however, that the site was used over a period of several hundred years which is congruent with the density and variety of the rock art.

42Ka2610

Test excavations were conducted on this site in 1984 by the Kanab Field Office in response to a proposal for the BLM to dispose of the tract on which it is located. The excavations revealed a large relatively deep aceramic pithouse. Because the site was found to have high research potential the exchange proposal was dropped and the tract was retained. Unfortunately, no further investigations have been carried out at the site.

42Ka2610 is an apparent residential site located on a low ridge at the base of the Vermilion Cliffs near an agriculturally attractive reach of Kanab Creek. Surface evidence for the structure was an extensive stain situated on a southeast aspect slope of the ridge. Surface artifacts included two hammerstones, a basin milling slab, and a fairly dense lithic scatter. No ceramics were encountered on the surface or in the test excavations.

A 20x1 meter test trench across the stain with a 5x1 meter long trench at a right angle to it, revealed a 9 meter wide x 1.5 meter deep deposit interpreted as pithouse fill i.e., stained sand with twig sized charcoal, clay, burnt sandstone, bone, thinning flakes, and a single fragment of clay daub. A radiocarbon sample obtained from small charcoal fragments yielded a 2 sigma date of B.C. 60 - A.D.240 (Beta 10844) with a calibrated midpoint of A.D. 75 (Beta-10844).

In 2006 the Kanab Creek Archaeological Project (McFadden 2006) recorded additional aceramic features nearby on a large multi-component site (42Ka2669) that may indicate that 42Ka2610 is part of a larger cluster of pithouses.

42WS2195, Hildale Site (Nielson et al. 1998)

The Hildale Site is a complex, long-term residential site with occupation beginning in the Basketmaker II period and extending through Early Pueblo II times. The earliest dated feature (F17) is thought to have been a pithouse. It was

dated at 2 sigma 64 B.C. - A.D. 259 (Beta 28336). (See additional description of 42Ws 2195 features in the Pueblo I section)

42Ka1168, Cave du Pont (Nusbaum 1922)

Smithsonian archeologist Neil Judd passed through Cave Lakes Canyon, which was on the route to Cottonwood Canyon, during his initial reconnaissance in 1915 - and probably again in 1919 when he did more intensive investigations in Cottonwood. In passing he noted a number of caves suitable for habitation in the well-watered canyon but did not investigate them (Judd 1926:51). Jesse Nusbaum of the Museum of the American Indian, Heye Foundation, eventually to become the Superintendent of Mesa Verde National Park, excavated one of them in the fall of 1920. Nusbaum called it Cave du Pont, a tribute to General T. Coleman du Pont who funded the work and its publication. Kidder and Guernsey described the artifacts and established the site as one of the classic type sites for the Basketmaker II period.

Cave du Pont is a dry, north aspect alcove holding 31 slab lined cists (Figure 17). The site was said to be exceptional not only due its excellent preservation, but because it was one of the few caves not disturbed by later puebloan occupations. A three to five foot thick mass of grass, oak leaves, corn husks, stalks and cobs protected the cists allowing detailed observations on cist construction and use (Figure 18). Cist diameter varied but averaged about 5 feet in diameter with 8 feet 9 inches the largest. Depth for most was fairly shallow ranging from a one to two feet and in one case 3 feet.

Cist contents included well-preserved 10-18 row maize cobs (Figure 15), an apparent seed cache, a small amount of *Chenopodium* sp. and squash fragments. In addition, there was evidence for *Ephedra* remains and *Helianthus* seed. The ubiquity of maize and the overall volume of the cists indicated the importance of the crop. While sufficient to provide for a multi-family sized group, superpositioning of a hearth, and reuse of some cists for burials, indicate the sites occupation occurred over a period of time.

Numerous artifacts including unfired "pseudo" pottery, stone pipes, atlatl darts and foreshafts, digging sticks, bones awls, a yucca bag, square toed

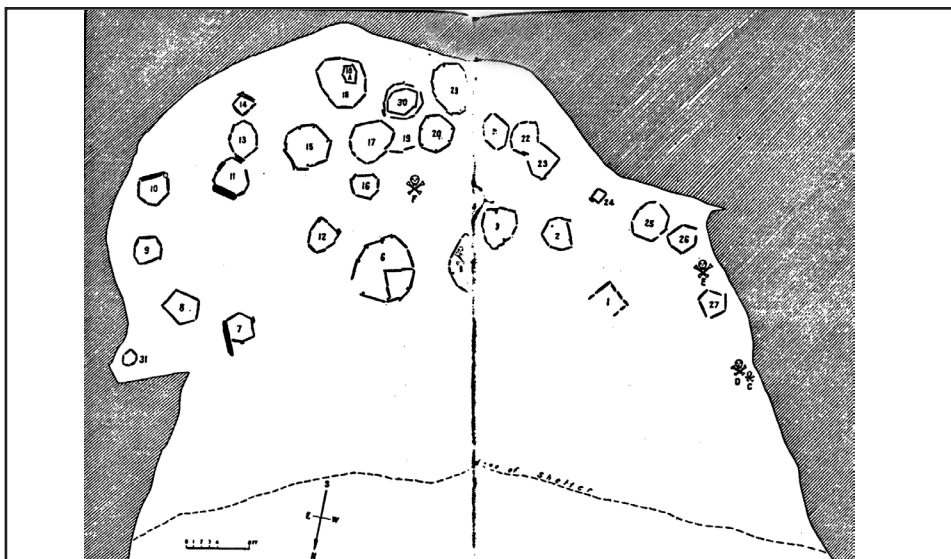


Figure 17. Cave du Pont site plan (Nusbaum 1922).

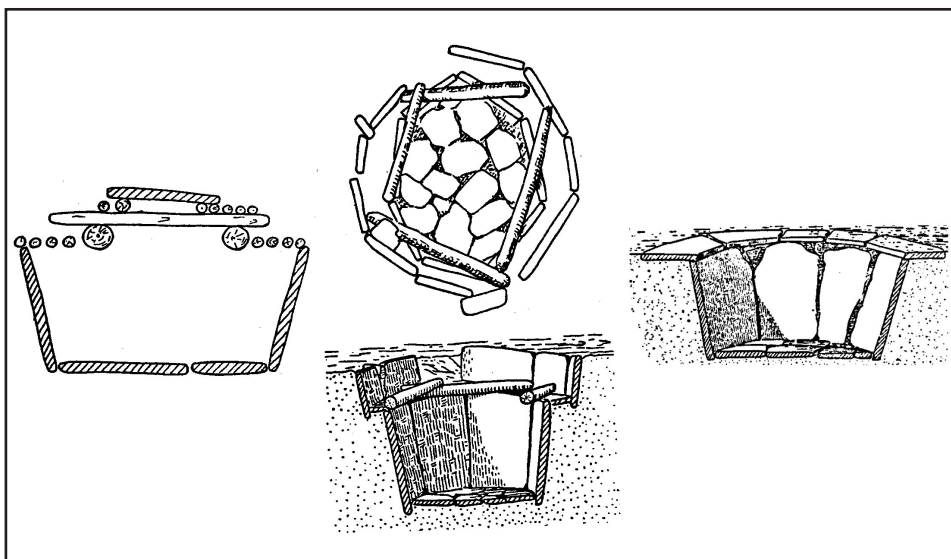


Figure 18. Examples of BM II cist architecture at Cave du Pont (Nusbaum 1922).

yucca fiber sandals, and a variety of perishables including baskets, cordage and matting. Necklace beads were mostly made from seeds, but also included stone and *Olivella* sp. shell.

Although no atlatls were recovered, dart shafts and foreshafts were. A single dart point was found in a "medicine pouch." The point is described as tanged and made of red jasper, well chipped, and measuring 1 7/8 inches long (Kidder and Guernsey 1922). A photograph of the point (PL.LXVI) seems to compare well with the single corner-notched point found at 42Ka3576 in Johnson Canyon (Figure 20).

The majority of the basketry was two-rod and bundle. Kidder and Guernsey (1922:97) describe

a fragment of a "sifter basket" (Figure 19) with a weaving technique similar to examples found near Escalante (see 42Ka4158, 42Ka172) and elsewhere in the Fremont culture area. Several square-toed Basketmaker style sandals were also recovered. In all, Kidder and Gurnsey had no doubt that these artifacts were near identical to Basketmaker artifacts from caves in Northern Arizona.

Nusbaum noted the presence of rock art on the back wall of the alcove but did not describe it. While not extensive it included a small anthropomorphic pictograph about 40cm. high (Figure 16), separate sets of yellow and red hand prints, and small anthropomorphic figures in white and red.

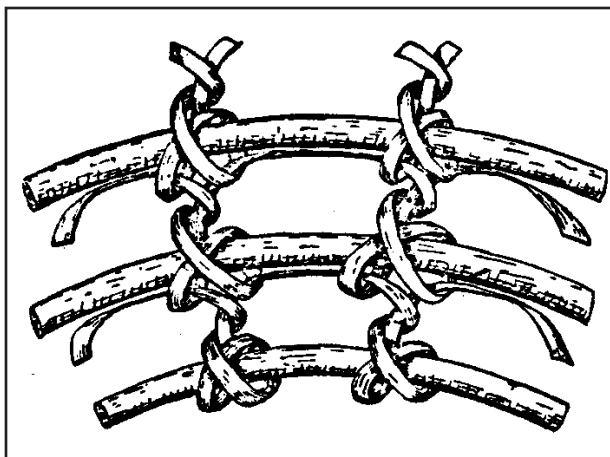


Figure 19. Weaving technique for “sifter basket” from Cave du Pont (Nusbaum 1922).

Presumably all are associated with the Basketmaker II occupation.

No habitation structures were identified within the alcove. Clearly, given the number and variety of artifacts, substantial amounts of time were spent at the site farming the well-watered canyon bottom below. Winter residences were apparently located elsewhere.

Two flexed adult burials were encountered. Both were laying on their backs with knees up and were interred in storage cists. Of four additional burials in the fill of the alcove, three were disturbed although one was thought to be extended and one was an incomplete, secondary interment - apparently a common BM II mortuary occurrence (see 42Ka3576, 42Ka6032).

W.S. Stallings Jr., associate editor of the *Tree-Ring Bulletin*, provides the following account of dating Cave du Pont. Nusbaum had cached timbers, which had been used to roof storage cists, at the end of his excavations “in anticipation of possible future value.” In 1936 he returned and retrieved five timbers: one oak, three juniper and a single pinyon that yielded a date of 91 A.D. to 216 A.D. (Stallings 1941:4). The date was eventually rejected as not up to modern dating standards (Bannister et al. 1969:11). Recently, as a result of a “breakthrough with the Mammoth Creek chronology” the date (A.D. 217rb) has been confirmed along with an additional specimen dated A.D. 220b (W. Robinson 1992 letter communication).

As Stallings aptly noted: “There are no means at present for judging accurately the duration of

occupancy of Cave du Pont or the position of the 217 date in Basketmaker II” (Stallings 1941:5).

Recently, Smiley and Robins (1997) reported two radiocarbon dates from well-formed maize cobs thought to be part of a seed corn cache found in Cist 30: 1720-1540 B.P. (Beta 104596) and 1810-1560 B.P. (Beta 104597). Calibrated midpoints are reported respectively as 1630 B.P. and 1690 B.P.

The tree-ring and radiocarbon dates from Cave du Pont, in the range of A.D. 200-300, compare well with those from other BMII alcove storage sites in northern Arizona. Material culture items, perhaps with the exception of rock art style, are also similar giving the impression of a uniform cultural horizon across the Colorado Plateau during this period. Clearly a seasonal occupation, Cave du Pont’s relationship with open habitation sites such as the Reservoir site and 42Ka2610 remains to be understood.

42Ka3576 (Edgar 1994)

This small, single component site was used for the interment of multiple burials during the Basketmaker period. It is located above Johnson Canyon under the rim of the Vermilion Cliffs. Canyon. The southeast aspect shelter measures 6m x 4m and was used solely for the sequential interment of apparently partial burial remains. Associated artifacts were limited to a few basketry fragments and a large corner-notched Basketmaker II style corner-notched dart point. The point was made of a fine-grained, medium quality, tan chert and measured 45mm x 23mm (Figure 20).

The projectile point morphology is very much like White Dog Phase corner-notched dart points, although the distinctive flaking technique described by Geib (1996:63) is problematic. Keller depicts a similar point from the nearby Skutumpah Terrace (Keller 1987:74). Possibly of significance, Eccles and Walling-Frank describe only a single large Elko Side-notched dart point from the extensive excavations at the Reservoir site (Eccles and Walling-Frank 1998:10.39).

A few tiny fragments of poorly preserved basketry appear to be a tightly woven version of a two-rod foundation characteristic of Basketmaker III (Hewitt 1980). A single two sigma radiocarbon date of A.D. 5-250 (Beta-40332), with a calibrated

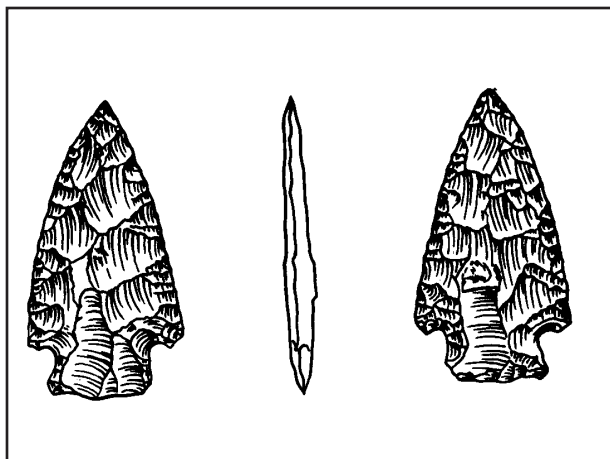


Figure 20. Basketmaker II corner-notched projectile point, 42Ka3576.

midpoint of A.D. 120, was obtained from a partially burned stick found within the earliest pit.

42Ka3576 was reported by a local informant and although it became the subject of local interest, it did not appear to have been disturbed prior to excavation. The shelter held a tightly clustered concentration of human bone apparently exposed by wind erosion. Additional interments were buried in shallow, loose, sandy deposits originating in the Navajo sandstone. The initial burial was almost completely articulated and had been placed in a partly slab-lined pit. The individual was positioned on its back with legs flexed at the knee. Subsequent interments in two shallow pits were interpreted as sequential with the latest intruding upon and displacing the earlier; these remains were partial, suggesting that most were secondary “bundle” interments (Edgar 1994:10). Observations on diet using the stable carbon isotope method have been made by Martin (1996, 1999).

42Ka2548 (Edgar 1994)

Edgar reports her analysis of undated but presumably Basketmaker burials from this site located on private land in Johnson Canyon as part of her Master’s thesis. Multiple burials at this site were interred within cist-like natural depressions in an alcove formed in the Navajo sandstone formation. Initially recorded in 1983 by J. Janetski and A. Nielson, they report that the site had been severely disturbed at that time but displayed at least 23 depressions from 1.5 to 3 meters deep - many

with evidence of having been sealed with slabs and clay. Although virtually all contextual relationships had been destroyed, it was apparent that the site was used to inter multiple burials with many of the later interments intruding upon those buried earlier. As noted elsewhere in this volume bed rock cists were a commonly used as granaries at least as early as BMIII/PI times.

42Ka3575 Dairy Canyon Alcove (Edgar 1994)

Dairy Canyon Alcove is a storage and rockart site located in a tributary of Johnson Canyon at an elevation of 5,760 feet. Multiple farming options in the vicinity include a spring fed setting in the canyon bottom and dryfarming on the extensive tablelands above the canyon. The shelter holds several large bell-shaped storage cists that occurred naturally, or were excavated, into the Navajo Sandstone bedrock. A large pictograph panel covers the back wall of the alcove. An extended burial (possibly a secondary interment) and an infant are reported from a large 1.5 meter deep cist (Edgar 1994, Martin 1996). Eight of approximately 24 timbers covering the cist were submitted to the University of Arizona, Laboratory of Tree-Ring Research, none were datable.

A second cist, whose contents were looted, held approximately one bushel of maize and a mass of juniper bark. Only a few Mesquite (*Lino Gray*) sherds were observed on the slope below the site. Of 135 corn cobs collected from the cist, 14 were 10 row, 1 were 12 row, 41 were 14 row, and 16 were 16 row; no eight rowed maize occurred. These row counts are similar to those at Cave du Pont and South Fork Indian Canyon (Figure 15).

A 12 row cob (13cm.x2.5 cm.) was selected from the collection and was radiocarbon dated at 2 sigma cal. A.D. 75 to 410 with an intercept of A.D. 240 (Beta-14052).

42Ka6032, Tommy Turf site (Zweifel et al. 2010)

The Tommy Turf site is an isolated multiple interment on private land reported to the GSENM after it was exposed by a pipeline excavation trench within the City limits of Kanab. The site lies at 5,000 feet some forty feet above a sod farm – an alluvial setting with a high water table that prehistorically

may have allowed sub-irrigated fields. Recognizing the significance and sensitivity of the site, the land owner reported it to the Monument which accepted the responsibility for excavating and reporting the remains. They were subsequently turned over to the State of Utah for additional analysis and repatriation.

Zweifel's report describes an oval shaped pit feature measuring 140cm x 120cm excavated some 40cm below the prehistoric surface. The pit held the remains of eleven, mostly complete, individuals. It was interpreted as a single event interment of nine primary burials (relatively complete and articulated) and two secondary burials. Associated artifacts included a kaolinite pipe, bone whistle or flute, shell beads, a euhedral quartz crystal and two pendants. Other items included a two handed mano, a biface fragment, and local chert debitage.

A maize based diet was indicated by stable carbon and stable nitrogen isotope values of -7.3 0/00 and -7.9 0/00 analysis performed on two of the individuals. Health problems of the population included porotic hyperostosis and cribra orbitalia which are related to a deficiency of dietary iron and poor oral health all of which indicate a heavily reliance on maize. The remains showed no evidence of violence but three individuals did display evidence of tuberculosis suggesting to the authors that the nine primary burials were a case of disease.

Two essentially contemporary dates were obtained from the feature: individual A (an adult male) was dated Cal B.C. 200 - A.D. 70 (Beta 222449) and individual B (a child) dated Cal. B.C. 160-A.D. 50 (Beta222450).

Although largely obliterated by modern housing, subsequent Virgin occupation on the ridge was evidenced by BMIII, Pueblo I and Pueblo II ceramics. While not necessarily continuous, long term occupation of sites and localities is a common Virgin occurrence.

42Ka1978, Gnatmare Site (Metcalf 1981)

The Gnatmare Site is a Late PII/PIII residential site with no indication of earlier occupation. A conventional date of A.D. 125 +/- 75 (Uga-3750) assayed on charcoal from the Level II hearth is considered aberrant - apparently old wood was dated. (See full description under PIII).

42Ka2667, Dead Raven (Walling and Thompson 1988)

The earliest radiocarbon date reported on this PI/PII habitation site is 1690+/- B.P. or A.D. 260 conventional (Beta-23053). The assay is considered aberrant but conceivably it originated in an unrecognized early occupation of the site. (See full description under Early PII).

42Ka4859, Road Kill site

This is a partially excavated, complex Basketmaker III - Pueblo site. Like Gnatmare and Dead Raven it yielded two unaccountably early dates on charcoal. Calibrated dates are B.C. 100-A.D. 70 (Beta 167439) from the floor of Cist 2 and Cal A.D. 20 -220 (Beta 167440) from the F40 hearth. (See full description under Late BM III).

42Ka1969 The Kanab Site (lower component) (Nickens and Kavamme 1981)

Backhoe exploration trenches encountered an extensive (7 meters plus) buried strata of stained sand underlying the Pueblo II pithouse excavated on this site (see Early Pueblo II section). The conventional date on charcoal from the deposit was 1460+/- 120(RL-1398). An Elko Corner-notched projectile point was retrieved from the deposit.

While no other features were identified, the deposit was not pursued and may well hold significant cultural features. The Kanab site lies along Kanab Creek about one mile west of the Jackson Flat reservoir excavations. Based on thick organic deposits exposed in the bank of Kanab Creek and present day riparian vegetation including cattails, it is a likely setting for Basketmaker II settlement.

42Ka3684 Section Corner Alcove

This large, 60 meter wide, west aspect, alcove is located at the head of a short tributary of Johnson Canyon at an elevation of 5,400 feet. Although badly looted, the site displays evidence for several slab-lined storage cists excavated into the rocky colluvium just above a seep. Also present is a large boulder with numerous "sharpening grooves." These ground features are common on Basketmaker II period sites.

Red pictographs on the back wall include both triangular and simple anthropomorphic figures, a “head-dressed figure”, hand prints, and a long chain-like design. Little refuse and few artifacts suggest the cave was not used as a residence. A single small corncob fragment found on a disturbed surface yielded a 2 sigma calibrated date of A.D. 135 to 540 with a midpoint of A.D. 365 (Beta-140953).

42Ka4478
(Nash 2013)

Excavations at this site were carried out by Montgomery Archaeological Consultants as part of a Utah Department of Transportation (UDOT) project in Kanab Canyon. Primary features included a stepped storage cist (F8), superpositioned hearths (F7, upper; F9, lower), a slab-lined pit (F10), eight petroglyph panels, and a number of abraded grooves on the nearby cliff face.

Material culture at this apparent nonresidential site was relatively abundant and included both chipped and ground stone. Chipped stone artifacts bear a striking resemblance to the BMIII assemblage at 42Ka2780 including; a Rose Spring Corner-notched projectile point that, depending on its actual context, might be the only arrow point recovered from a BMII site on the Grand Staircase (see Geib and Bungart 1989 for a discussion on temporal and spatial distribution of arrow points) ; a flake graver, also very common artifact type at 42Ka2780. Numerous Rose Spring points and gravers were recovered from the pithouse at 42Ka2780 (Figure

25). Also notable was the presence of an *Olivella* sp. bead recovered from the cist.

Ninety-five sherds not in direct association with the features were recovered. Many were corrugated and 4 were described as “indeterminate brown ware” suggesting a very late use of the site.

Two radiocarbon dates on charcoal overlap and appear to be close to the end of the Basketmaker II period. The benched cist yielded a 2 sigma cal date of A.D. 260-300; A.D. 310-430 (Beta 252928). Hearth 2 (F9, the lower) dated A.D. 410-580 (Beta252929).

Benched storage cists such as F8 (Figure 21) are rare but do occur in the Kanab area. Nash reports that the cist was not remodeled but constructed with two floors. Judd describes what appeared to be a stepped, slab-lined, semicircular cist or “room” in Cave 2, Cottonwood Canyon. The lower floor was 22 inches below the upper. Judd believed Cave 2 had both “Basket Maker” and “Cliff-dweller” occupations (Judd 1926:97).

42Ka4478 is one of several BMII sites with storage cists along this reach of Kanab Creek. The cist measures 1.2m deep on the north and .83m deep on the south and 2.2m in diameter with a volume of about 3.14 cubic meters. This is a figure comparable to the storage capacity at Early Pueblo II site 42Ka6293 located nearby. Nash estimates the cist would have held 90 bushels of maize. He assumed that at a production rate of 12-18 bushels of unshelled maize per acre, 5-7.5 acres would be required to fill the cist – acreage readily available along Kanab Creek.

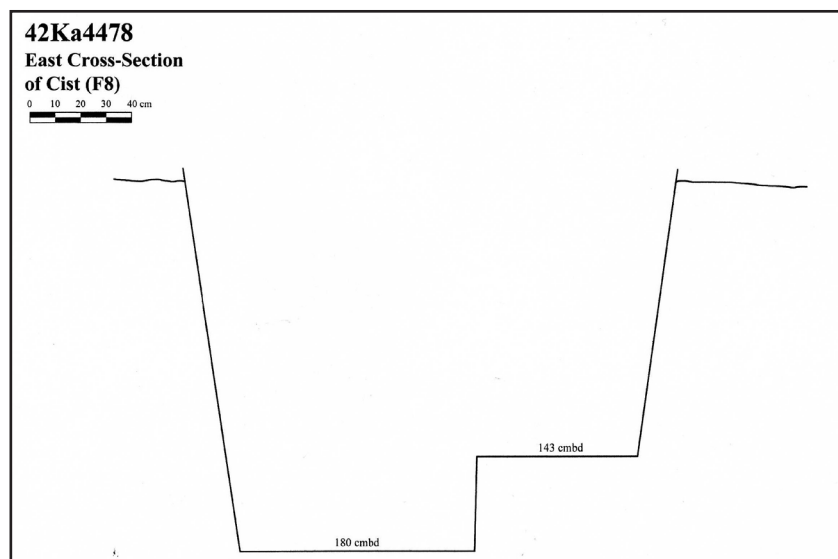


Figure 21. 42Ka4478, stepped cist profile (after Nash 2013).

**42Ka7715
(Patterson 2014)**

This site consists of a fairly extensive but disturbed cultural deposit that held a small enigmatic structural feature about two meters in diameter that yielded a Cal. A.D. 235-385 date (Beta-380907). The site is located just north of the Early PII site 42Ka6293, south a short distance from a prehistoric camp (42Ka6297), and in the vicinity of 42Ka 42Ka7714, an isolated roast with abundant burned bone (Patterson 2014). The feature occurred in an extensive but very generalized deposit impacted on the west side by earlier road construction. Judd (1926) describes several sites on the floor of the canyon disturbed by road building and work on the Kanab City reservoir during his 1915-1920 reconnaissance. Clearly, this reach of Kanab Creek was intensively used throughout the Formative Period.

42Ka6043 Overlook Alcove

This site is located in a south to west aspect alcove overlooking Kanab Canyon and much of the activity described above. Its location some 500 feet above the canyon floor and just below John R. Flat allows both areas to be accessed. The site has two discrete spatial and temporal components: late Pueblo II masonry structures on the north (see description in Late PII section) and a discrete and separated series of apparent storage cists on the east (Figure 22). The features are badly looted with scattered rubble, pothunters spoil, and large chunks of purple adobe. Ceramics include both plain and corrugated although this portion of the site appears to be early with some minor later use.

A cob corn found on the surface of the north, presumably later component of the shelter, produced a radiocarbon date of Cal. B.C.50-A.D.130 with an intercept of A.D. 50 (Beta-202621). This suggests that to an unknown degree both early and late activities took place on both ends of the shelter.

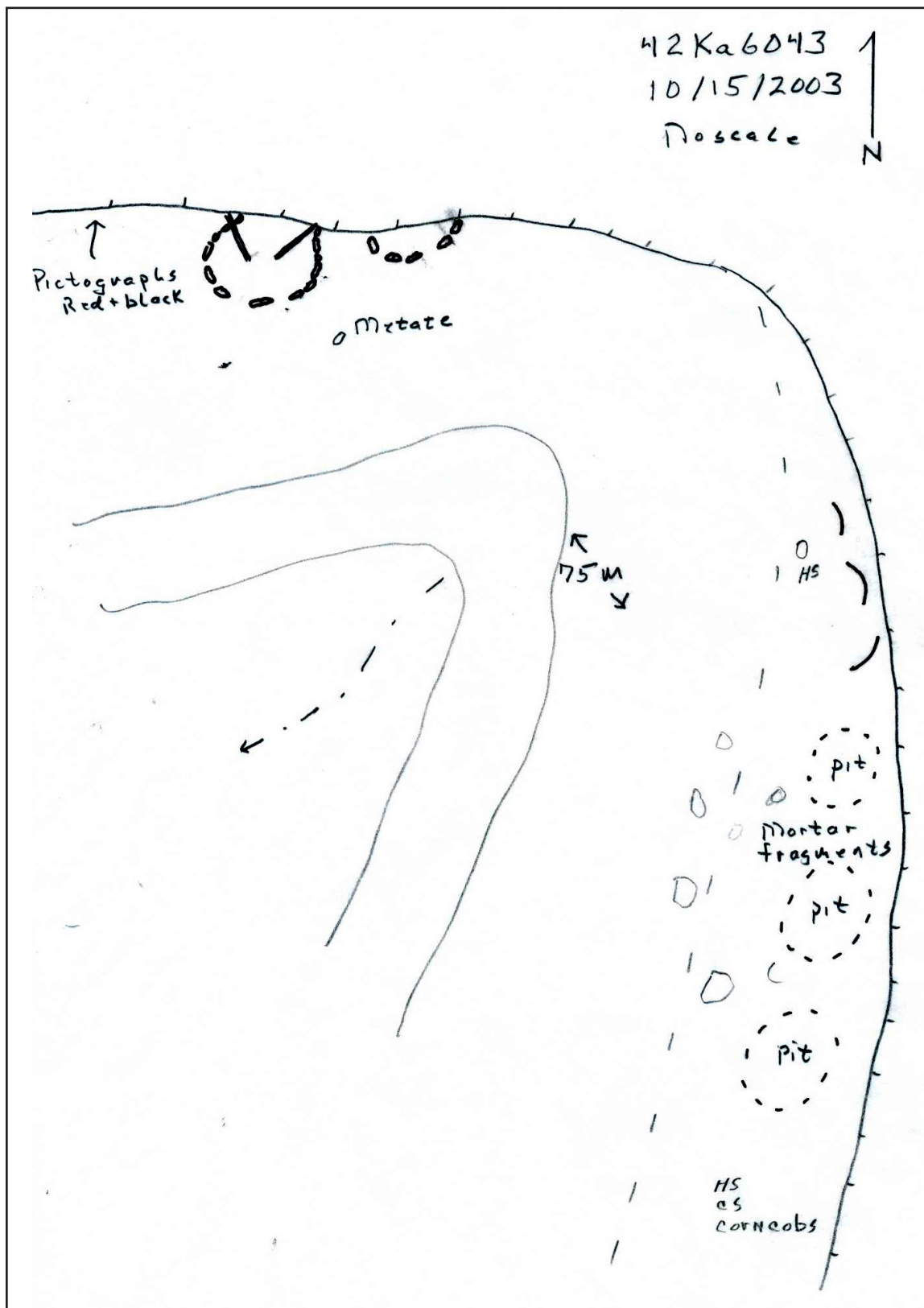


Figure 22. 42Ka6043, Overlook Alcove plan map.

BASKETMAKER III (EARLY) SITE DESCRIPTIONS

42Ka2780

This site is an extensive, single component, Basketmaker III “village” site located at 5,400 feet on the rim of the Shinarump Cliffs. The site occurs in a sandy, dryfarm setting but also overlooks the alluvium deposited by Seaman Wash originating in the Vermilion Cliffs to the north. Suspected pithouses and more obvious slab-lined storage cists occur in what appear to be household clusters extending over a 250m x 75m area.

In 1985 excavation of a looted pithouse was undertaken as part of the Cedar City District’s program to salvage data from badly damaged sites. Although much of the fill was disturbed, careful excavation revealed undisturbed surfaces on the floor and bench (Figure 23).

Pithouse 1 heralds architectural features commonly found during the succeeding Pueblo I period including: an encircling bench with 6-8 symmetrically placed support posts, a slab-lined interior pit, floor vault, and a clay coped hearth (Figure 24). A significant difference with the architecture of later periods is the shallow antechamber which appears to have served as an activity area, ventilator, and entryway. Floor features include: a partitioned vault, both slab-lined and earthen bins, and possible ladder sockets. The layout of these features appears random, by Pueblo I their layout becomes standardized and includes sand-filled pits in the northwest quadrant of the floor.

Two artifact assemblages were found in floor contact: on the bench between two posts to the north was an assemblage of 14 stemmed and corner-notched Rose Spring projectile points (Figure 25) and along the west wall of the main chamber was group of ground stone artifacts consisting of a broken but serviceable trough metate (Figure 26), a hammerstone, and a worn, two-handed mano. Additional artifacts in the fill included: a basin

metate with a secondary mortar depression (Figure 26), a collection of bone awls, several delicate graves, and four miniature ceramic vessels, and abundant grayware sherds.

As indicated on the pithouse plan, two post occupational events affected the fill and features of the pithouse: looters disturbance in the fill and along the floor, especially on the east and an apparent intrusive pit excavated into the floor cutting both the hearth and slab-lined bin on the south. As a result of the later disturbance, the level of origin for the pit could not be determined but it seems likely it was a prehistoric, post-occupational event.

Two radiocarbon samples, taken from the outer rings of structural timbers found in the disturbed fill of the pithouse, yielded 2 sigma range dates of A.D. 340-600 (Beta 16079) and A.D. 210-605 (Beta-16080). Calibrated midpoints were A.D. 435 and A.D. 410 respectively. Although the total ceramic assemblage consists of four miniature vessels (Figure 27 lower) and only a single sherd from an undisturbed context (the vault), these dates are among the earliest for a ceramic bearing pithouse on the Grand Staircase physiographic section.

Additional radiocarbon dating was done in 2001 to augment the existing dates. In lieu of maize or charred seed remains a tarsal bone from an artiodactyl was dated (SUU, FS36, Accession # 2690-147, collected 10/26/85). Due to disturbance its context was noted as F4 fill/surface. A conventional radiocarbon age of 1390+/-40 B.P. and a 2 sigma calibration of A.D. 610 to 690 (Beta 157843) with a calibrated midpoint is A.D. 650. If the bone was from pithouse fill, it is evidence for continued occupation on site into late Basketmaker times; if it actually was in floor contact, it suggests that the original dates (on timbers) may be too young. Additional small bone is present in the collection that could be radiocarbon dated.

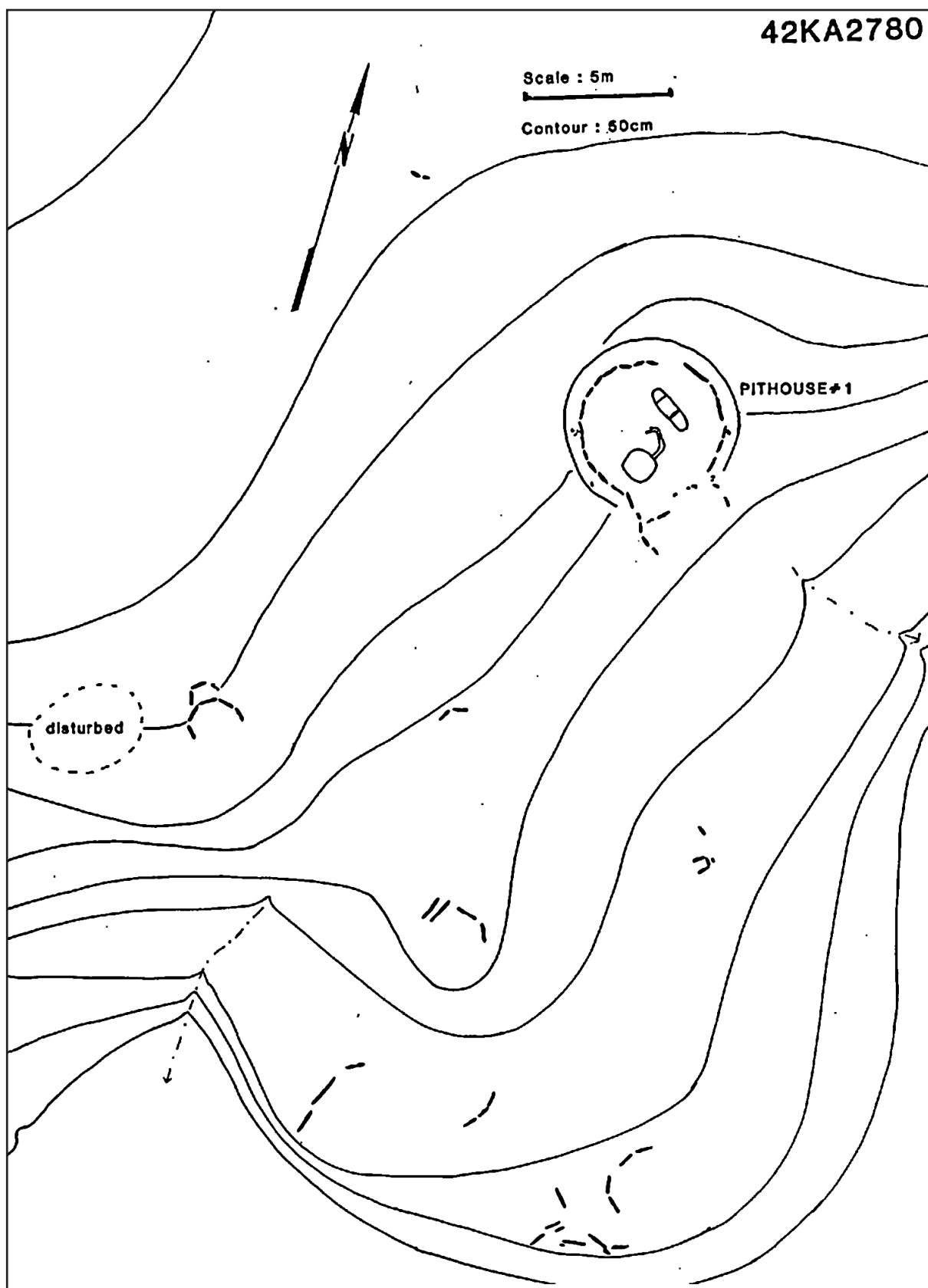


Figure 23. 42Ka2780, pithouse and associated cist cluster.

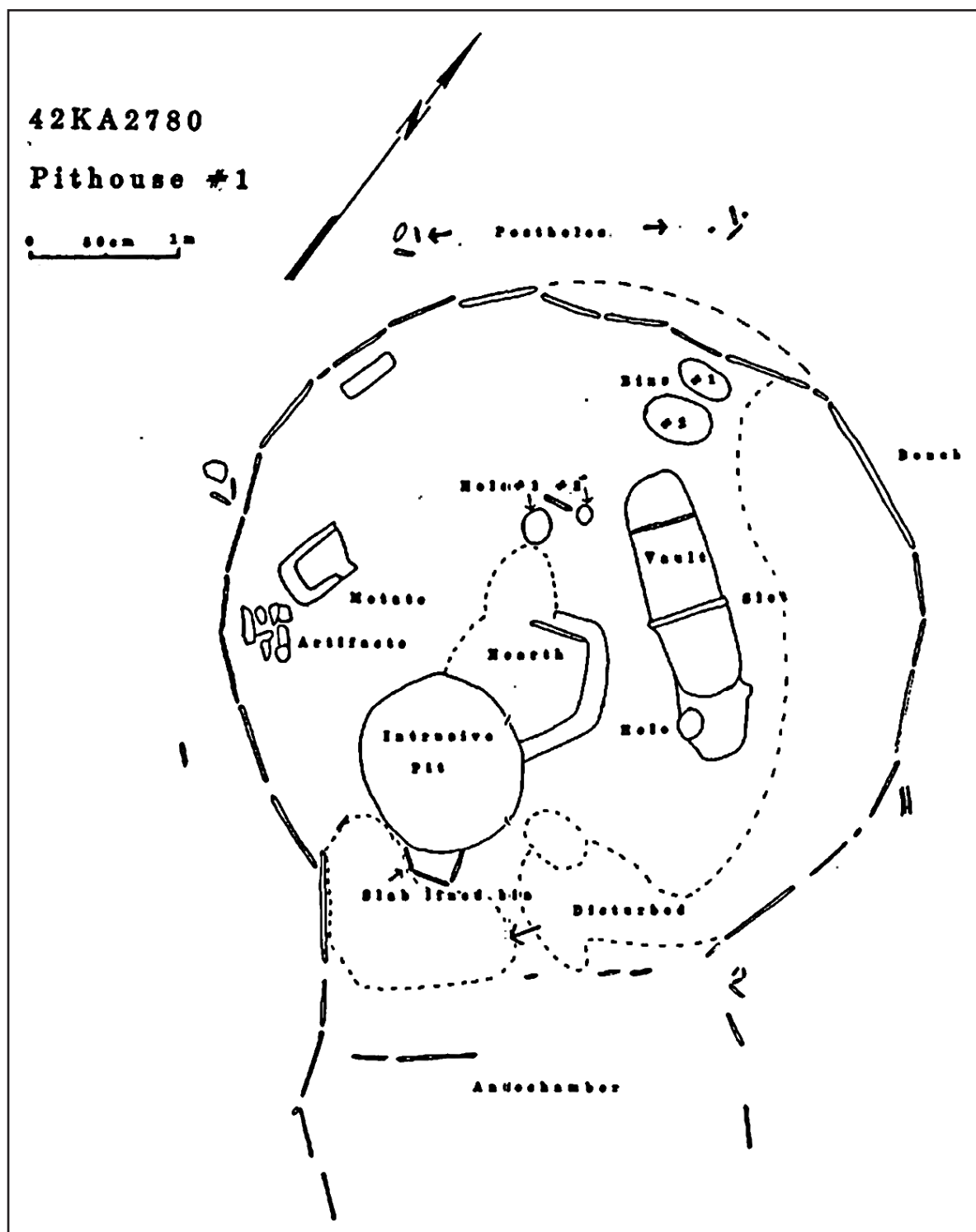


Figure 24. 42Ka2780, pithouse plan and profile.

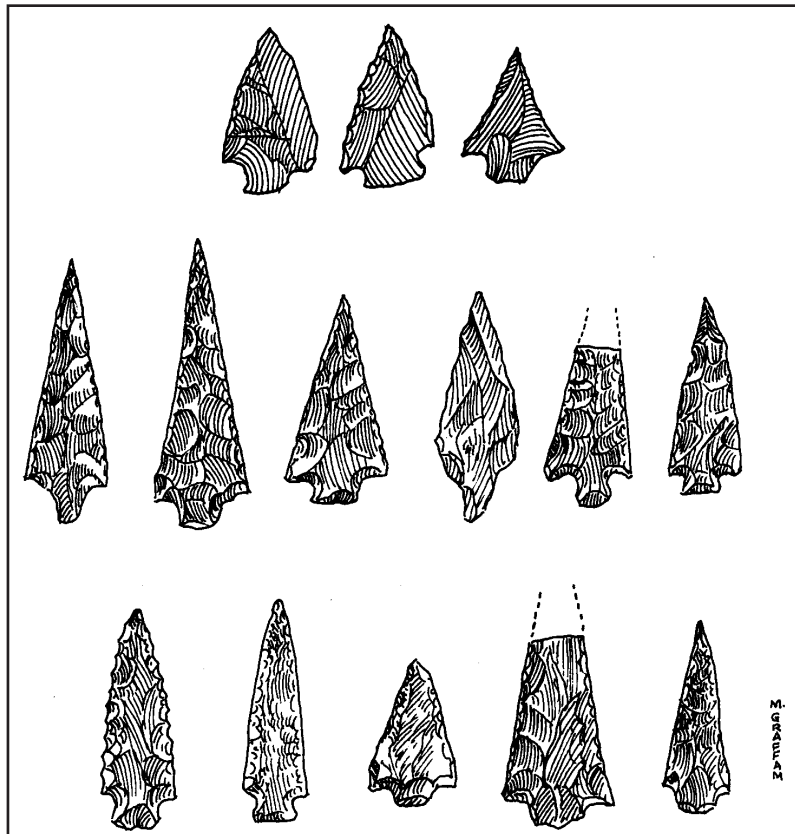


Figure 25. 42Ka2780, Rose Spring Corner-notched and stemmed arrow points from Pithouse 1.

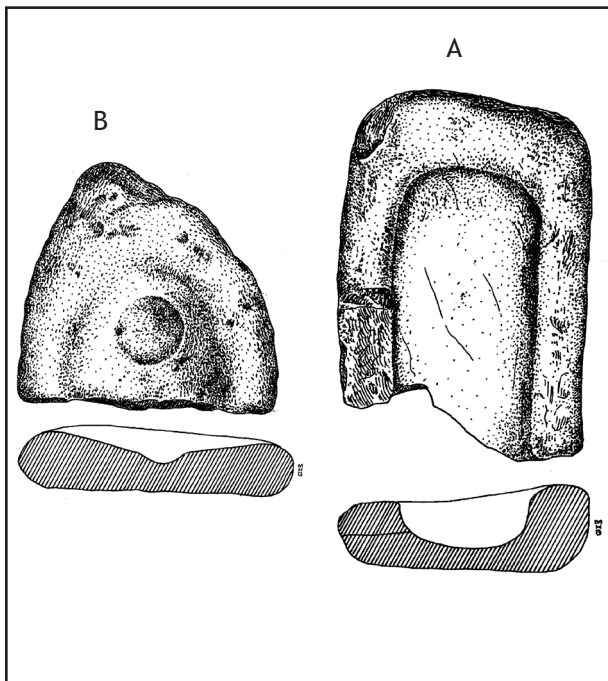


Figure 26. 42Ka2780 ground stone artifacts: (A) Trough metate from floor of pithouse. (B) Basin metate with mortar, fill of pithouse.

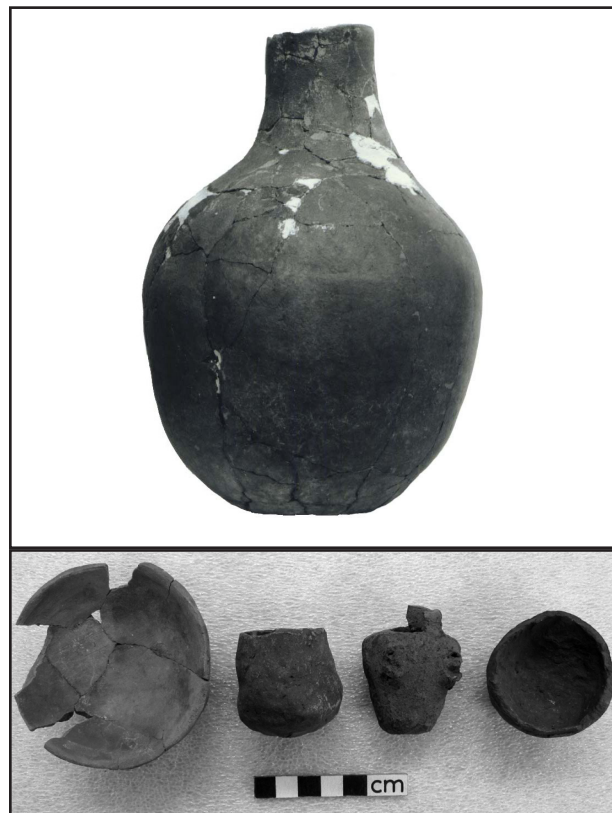


Figure 27. 42Ka2780, olla (43 cm tall) from eroded surface context (above); miniature vessels from bench on pithouse (below).

42Ka1796

42Ka1796 is an extensive Basketmaker III “village” site displaying 50+ slab-lined storage cists grouped into three clusters. Larger curving slab alignments and soil stain suggest at least one pithouse is associated with each cluster. The site is located on a sandy south slope at an elevation of 5,700 feet near the north rim of Parunaweap Canyon. While multiple options for farming may have been available, including the East Fork of the Virgin river some 800 feet below, the site location is definitely in an upland dry farm setting. It is one of well over 100 sites representing the early end of a long occupational sequence spanning the Basketmaker III, Pueblo I, and Early Pueblo I periods in the upper Virgin River drainage (Figure 5). Similar to 42Ka 2780, it consists of cist clusters with one or more habitations and has very little pottery on the surface (Figure 28).

An eroding pithouse in the central cluster was excavated in 1977 (Figure 29). Similar to Pithouse 1 at 42Ka2780 on the eastern Grand Staircase, it has an encircling bench with symmetrically spaced roof supports set on it and a shallow antechamber. Clay associated with two of the posts suggested the use of clay “support” ridges similar to those in Zion National Park (Schroder 1955) and Cave 4 in Cottonwood Canyon (Judd 1926). Floor features include a clay coped hearth and a rather unique sandstone slab alignment that partitions off the southwest quadrant of the floor. No sand filled pits or other floor features were observed nor believed to be present - although the floor clay was not removed to determine if such features had been sealed over. No artifacts were in contact with the

floor other than a smooth limestone slab possibly used for cooking.

The shallow antechamber on the south was an open “u” shape, lightly constructed and separated from the pithouse by a narrow trough feature that may have supported (anchored) some sort of enclosing wall. It feathered out on the south to the prehistoric occupation surface.

A group of approximately 12 slab-lined cists occurs a few meters northeast of the pithouse. Apparently contemporary they are not formally arranged but rather appear to be randomly placed with some abutting one another and others standing alone. Again, a layout not unlike the arrangement at 42Ka2780 located 35 miles east on the Shinarump Cliffs (Figure 23).

While ceramics on the surface of the site are minimal and are restricted to undecorated Mesquite Gray, three distinctive jars and a deep bowl were located in the fill of the pithouse. One of the jars was deformed just prior to being fired and may have been discarded (Figure 30b). These vessel forms are similar to those recorded from a looted site near Johnson Canyon and probably represent the earliest ceramic styles in the eastern Virgin region (Figure 31). A large panel fragment of a polished “brownware” (cf. Obilisk Gray) also occurred in the fill along with a preponderance of unpolished types.

Tree-ring specimens collected were not datable (Appendix B). A radiocarbon assay taken from the outer rings of a post yielded a 2 sigma range of A.D. 340 to 705 (Beta 6284). While the intercept date is A.D. 575, the calibration graph allows for the possibility of a date closer to the uncorrected age of A.D. 440.

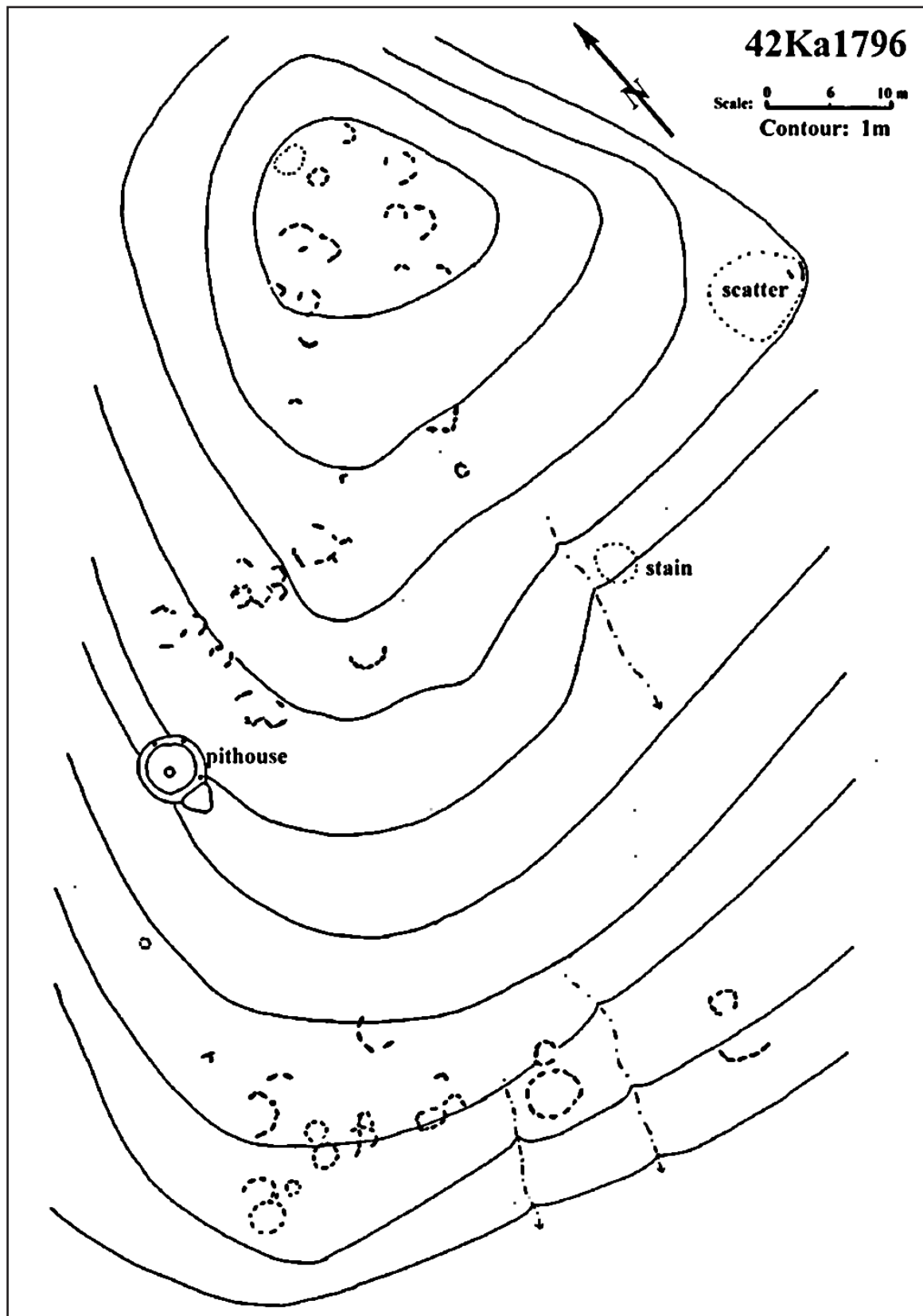


Figure 28. 42Ka1796, pithouse and associated cist cluster.

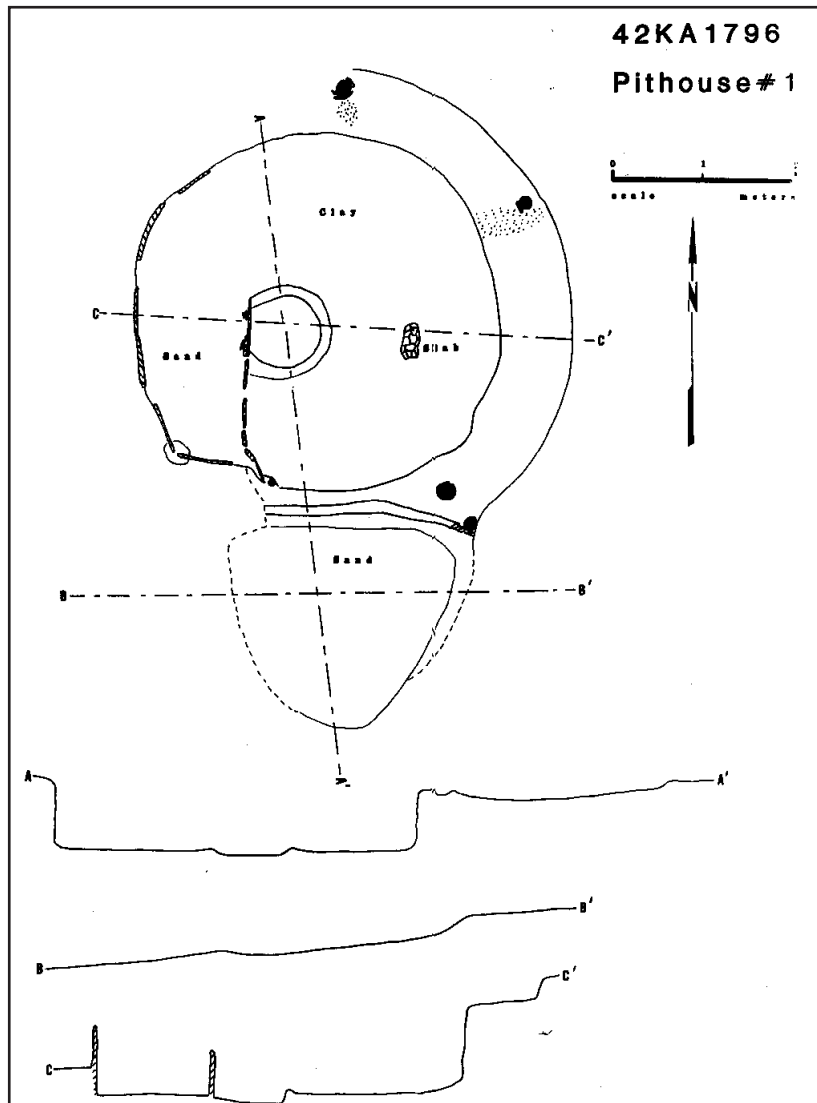


Figure 29. 42Ka1796, pithouse plan and profile.

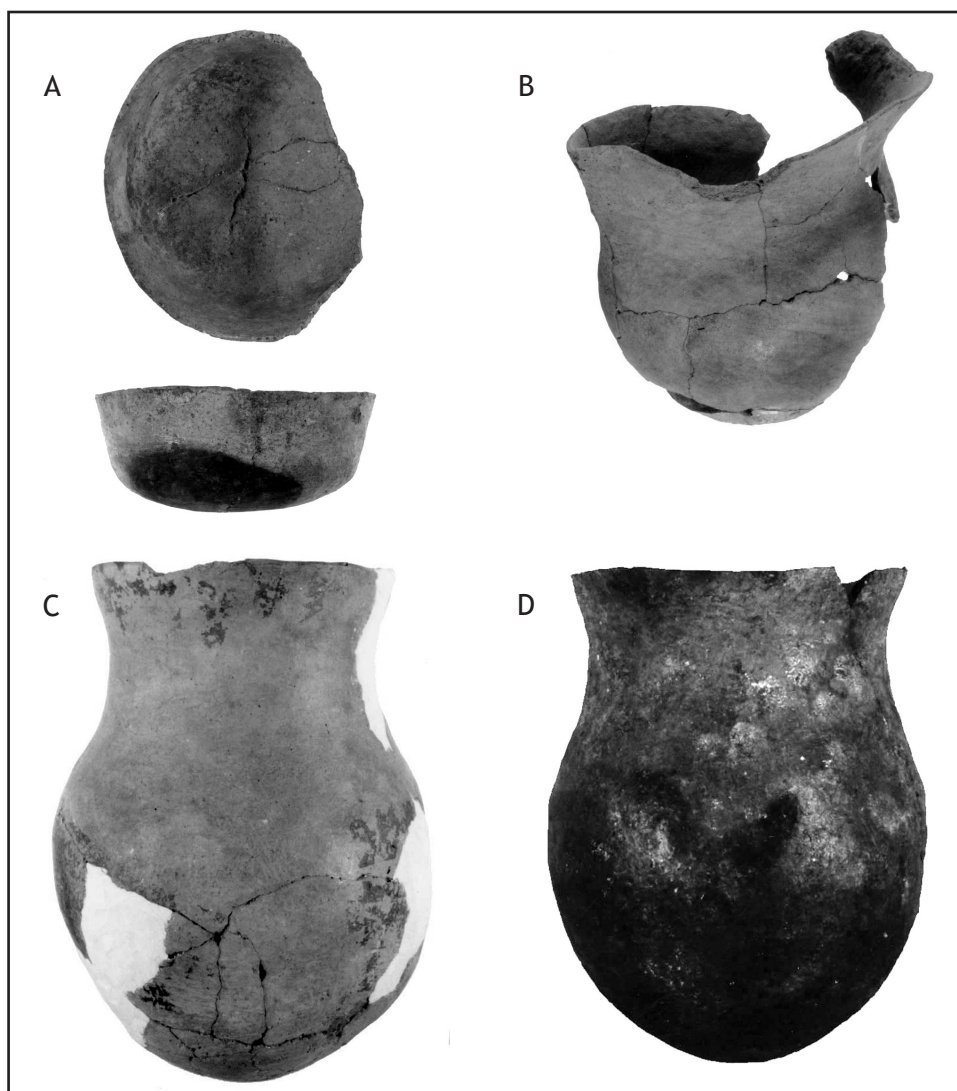


Figure 30. 42Ka1796 Mesquite Gray Vessels from the fill of Pithouse 1: (A) bowl, (B) warped jar; (C and D) large jars.



Figure 31. BMIII vessels from 42Ka4858 near Johnson Canyon.

**42Ka2574 Hog Canyon
(Schleisman and Nielson 1988)**

The Hog Canyon site is located in a riparian setting at the confluence of Kanab Creek and Hog Canyon at an elevation of 5,000 feet. The site appears to have been occupied as early as the Late Archaic and into the Basketmaker II and III periods (see Archaic Transitional descriptions).

Relationships between features and occupation surfaces at the site were difficult to establish during all periods. One such feature, Structure 1, an isolated Basketmaker III pithouse, was salvaged after it had been exposed in profile by a backhoe trench excavated for a city waterline. Although incomplete, the structure can be described as rather small, having an encircling bench with an interior pit lined with slabs and a shallow antechamber (described as a “use area”) on the south. Two C14 assays on charred roof beams from Structure 1 yielded 2 sigma range of A.D. 575-690 with a midpoint of A.D. 650 (Beta 8784) and, A.D. 430-660 with a midpoint of A.D. 590 (Beta 8785).

An additional pithouse, which was not excavated professionally, also occurred on the site. It lies a short distance from Schleisman’s excavations. Key features observed include: an overall width of approximately five meters, depth under one meter, the interior pit was faced with sandstone slabs that extended a few cm. above the level of the bench, the benches horizontal surface was also paved with

slabs, and possibly clay, at one time. The slab paved vertical and horizontal surfaces are similar to Cist 9 in Cave du Pont (Nusbaum 1922). The back wall of the bench was constructed of jacal which probably also formed the superstructure. A slab-lined hearth or bin occurred near the center of the structure. There was no obvious association of ceramics with the structure (photo on file at GSENM).

Salvage excavation at the Hog Canyon site never permitted its overall layout and function to be determined. Structure 1, however, does represent an early style Basketmaker III pithouse that was occupied during the late A.D. 500’s or early 600’s. The antechamber is similar to those described for pithouses on 42Ka2780 and 42Ka1796.

Note: Recent mitigation work funded by UDOT on this important reach of Kanab Creek (Nash 2013) and BLM dating efforts, suggest that the area was intensively used from BMII times through Late Pueblo II. Judd (1926) discusses numerous sites in the canyon that he viewed or had heard of from informants. One such site, uncovered by fresno scrapers when the town reservoir was rebuilt in 1911, was described by Delbert Riggs (later to be J. Steward’s outfitter) as “no trace of house walls” but several slab cists or hearths and 23 burials, “each interred on its back with limbs flexed” and “buried within a space of 30 feet square” (Judd 1926:48-49). Since only a few sherds were noted it seems likely the burials were Basketmaker.

BASKETMAKER III (LATE) SITE DESCRIPTIONS

42KA3670

This small habitation site is located on a ridge bordering a drainage near the base of the Vermilion Cliffs. Although the site has not been dated, a good example of a Lino/Mesquite Black-on-gray bowl with a bilateral design was found eroding from the site (Figure 32). The bilateral design layout is a common Virgin style that originates during BMIII and continues through the early Pueblo II period (Dalley and McFadden 1988). Presumably the vessel and site postdates the early Basketmaker sites described above which have yielded no designed ceramics. Breternitz 1963:82 considers Lino Black-on-grays “period of greatest abundance” to be between A.D. 610 and 875; and “best dated” between A.D. 620 and 875.



Figure 32. Mesquite Black-on-gray bowl from 42Ka3670 (GSENM Visitor Center, Kanab).

42Ka3670 consists of a 5 meter diameter slab-lined pithouse. Numerous jacal fragments indicate the structure burned. Fifteen meters west of the pithouse are the remains of several cists represented by two slab uprights and a rubble scatter. The bowl was eroding from the slope a few meters south of the cists and was associated with a few small fragments of unidentified bone.

42Ws326 (Roadrunner Village) (Baker and Billat 1992)

Although this large habitation and storage site is located along the Virgin River in the St. George Basin, it is briefly summarized here because it is one of the few completely excavated large Basketmaker III sites in the region.

The site consisted of four pithouses, 23 storage cists, two firebox features, a midden and a work area. The features extended east-west along a steep basalt strewn slope in a fashion possibly dictated by topography as much as design.

The authors believed that radiocarbon dates from Pithouse 1 best represented the initial period of occupation. Both were from SFP-2: charcoal yielded a radiocarbon age of 1300 $\pm$ 50 B.P. (Beta-24502); an AMS date (Beta-21478) on fragments of corn kernel yielded a ^{14}C date of 1465 $\pm$ 85 B.C. The weighted average of the two ages was cited as 1342.4 $\pm$ 43 B.P. (Baker and Billat 1992). “The calibrated age range of this average is A.D.604-A.D. 773 with a 94% probability that the target date falls within the period A.D. 637-773 (Table 6). This conclusion is in accord with the projectile point styles and ceramic collection, although the black-on-gray types normally present on sites this late, were virtually absent.

The remaining three dates are considerably older and were suspect to be “old wood.” An earlier occupation on such a site however would not be surprising.

Beta-Lab Number	Sample Location	Radiocarbon Age	Calibrated 2 Sigma Range
Beta 21477	Post in Pithouse 1, SFP-2	1830±60 B.P.	A.D. 52-264 A.D. 273-342
Beta 21478	Corn Cob in SFP-4, Pithouse 1	1465±85 B.P.	A.D. 404-692
Beta 24502	Charcoal in SFP-4, Pithouse 1	1300±50 B.P.	A.D. 641-781 A.D. 789-810 A.D. 838-866
Beta 21481	Post in Antechamber Pithouse 1	1620±90 B.P.	A.D. 227-638
Beta 21476	Possible hearth in Pithouse 3	1760±160 B.P.	90 B.C.-A.D. 610

Table 6. Radiocarbon Dates from 42Ws326, Road Runner Village (Baker and Billat 1992).

42Ka1499 Deer Creek Shelter #1

Deer Creek Shelter lies along a narrow, perennially flowing tributary to the Paria River on the northeast margin of the Grand Staircase section. Cave Valley style rockart in the shelter bears a striking resemblance to the type site, 42Ws69, located on the west side of the Grand Staircase (Figure 33). This rock art style is one of several traits the span the Grand Staircase physiographic section indicating a common cultural tradition during the early Puebloan period.

The narrow interior of the shelter provides very little room for structures or habitation of any sort. It is primarily a pictograph site however remnants of a small granary indicate storage was also a function. A corn cob fragment (10 row) collected near the granary yielded a 2 sigma radiocarbon date of A.D.655 to 780 with an intercept date of A.D.685 (Beta-132378). The association of the date and the rockart is tenuous at best but suggests that these Cave Valley style anthropomorphs may occur

as early as Basketmaker III or at least by Pueblo I times. Direct AMS dating of organic constituents in the pigments would help resolve the question of their actual age.

42Ws3015 The Hurricane Ridge Site (Buck and Parry 1999)

This single component alignment of storage cists lies on the rim above the Virgin River, in the St. George Basin just below the Hurricane Cliffs that form the western margin of the Grand Staircase. The linear layout of the surface storage units is similar to sites recorded both on the Grand Staircase and upstream along the Virgin River near the town of Grafton. The authors report eight radiocarbon dates (Table 7) and provide a calibrated average for the site of A.D. 650 (Buck and Parry 1999:479). Chronological controls over the site appear to be excellent. Because of the similarity of artifacts, ceramics and architecture with that of the study area, the Hurricane Ridge site is considered

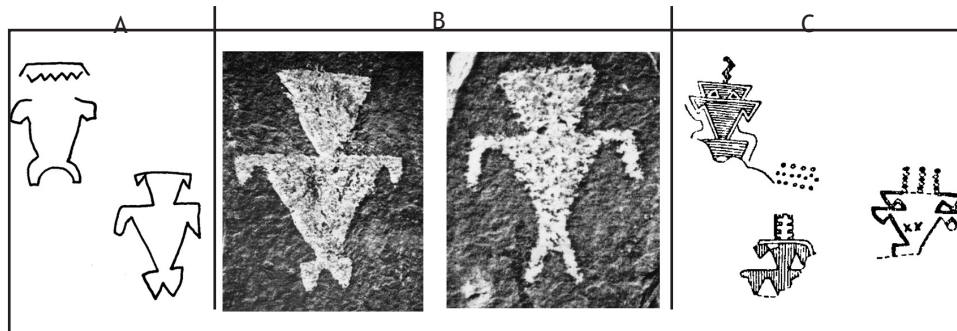


Figure 33. Cave Valley style anthropomorphs: (A) Cave Valley, 42Ws69; (B) Deer Creek Shelter #1, 42Ka1499; (C) Cave 1 Judd 1926).

Sample #	Provenience	13/12 C	Uncorrected C ¹⁴ age	Corrected C ¹⁴ age	Calibrated age - A.D.
DRI-3036	F2, Fill of hearth covered by sandstone slabs	-21.75 ‰	1389+/-73	1441+/-75	540-670
DRI-3038	F5, Stratum II	-24.93 ‰	1417+/-117	1418+/-118	450-720
DRI-3035	F6 (W½), Stratum III	-21.55 ‰	1281+/-84	1337+/-86	610-780
DRI-3037	F6 (E½), Stratum ID	-20.46 ‰	1384+/-100	1457+/-102	450-670
DRI-3041	F6 (E½, Stratum II (lower)	-26.40 ‰	828+/-222	806+/-224	1000-1400
DRI-3040	F9, Stratum II	-24.76 ‰	1313+/-138	1317+/-140	600-880
DRI-3039	970N/1002E, Level 1 ^b	-22.56 ‰	1468+/-240	1507+/-242	250-800

Table 7. Radiocarbon dates from Hurricane Ridge - 42Ws3015 (From Buck and Perry 1999) (All samples are calibrated using 68% confidence interval and corrected for 13/12 C.).

representative of a late Basketmaker III sites in both the St. George Basin as well as the Grand Staircase.

Because the site lacked the typical pithouse residence, Buck and Parry speculate that the site may have been just one of several storage/habitation sites along the Virgin River that was constructed by a co-residential group in order to maximize food production (Perry and Buck 1999:492). Another storage site along the Virgin River lacking evidence for residential occupation is the Pueblo I site 42Ws404 (Dalley and McFadden 1987). At 42Ws404 a pithouse was constructed late in the sequence of occupation but appeared not to have been used. At nearby 42Ws1349, lightly constructed “summer structures” were associated with each of two BMIII storage cist alignments. A deep pithouse, located between the two alignments, suggested that the site was occupied year-round, but this may not have always been the case. Thompson also excavated a substantial early Pueblo II storage site on Little Creek Mt. with no residential structures. Because of its location on bedrock, 42Ws3015 offers convincing evidence that cist alignments do occur in the absence of substantial residential architecture.

42KA2147

This is a small storage-habitation site located on a dune near the rim of Johnson Canyon at an elevation of 5,640 feet. Excavations were undertaken

in 1981 to salvage the remnants of a pithouse and three slab-lined cists (Figure 34). A bulldozed road through the south edge of the dune appeared to have trimmed the three cists to the grade level of the road and sectioned the south half of the pithouse.

Pithouse architecture at 42Ka2147 does not conform to expectations for either Basketmaker III or the Pueblo I period (Figure 35). The structure was small, measuring only 3.6m in diameter, the pit itself was partially lined with shaped sandstone slabs, and did not have a bench. Fill of the structure reached a maximum depth of 120 cm. against the north wall, however the maximum height of the wall itself was 75cm. 25cm. of dense pink structural clay overlaid the floor and intruded into open floor features. There was no indication of burning nor were there any timbers in the fill. The arrangement of floor features was not patterned. They included: 4 interior “postholes”, a deep unlined hearth, two basins filled with clean sand (cf. Bonanza Dune floor pits), two trash-filled pits - one nearly a meter deep and sealed by a slab, and two shallow slab-lined bins. Although intensively used and substantially constructed, the pithouse does not conform to the standardized layouts found at other early Puebloan sites in Johnson Canyon.

Cists 1-3 were all badly damaged, it was assumed that all three were deep slab-lined features that had been trimmed to within a few cm. of their floors by the bulldozer. Some question, however, remains about the configuration of their upper walls. Cist 1

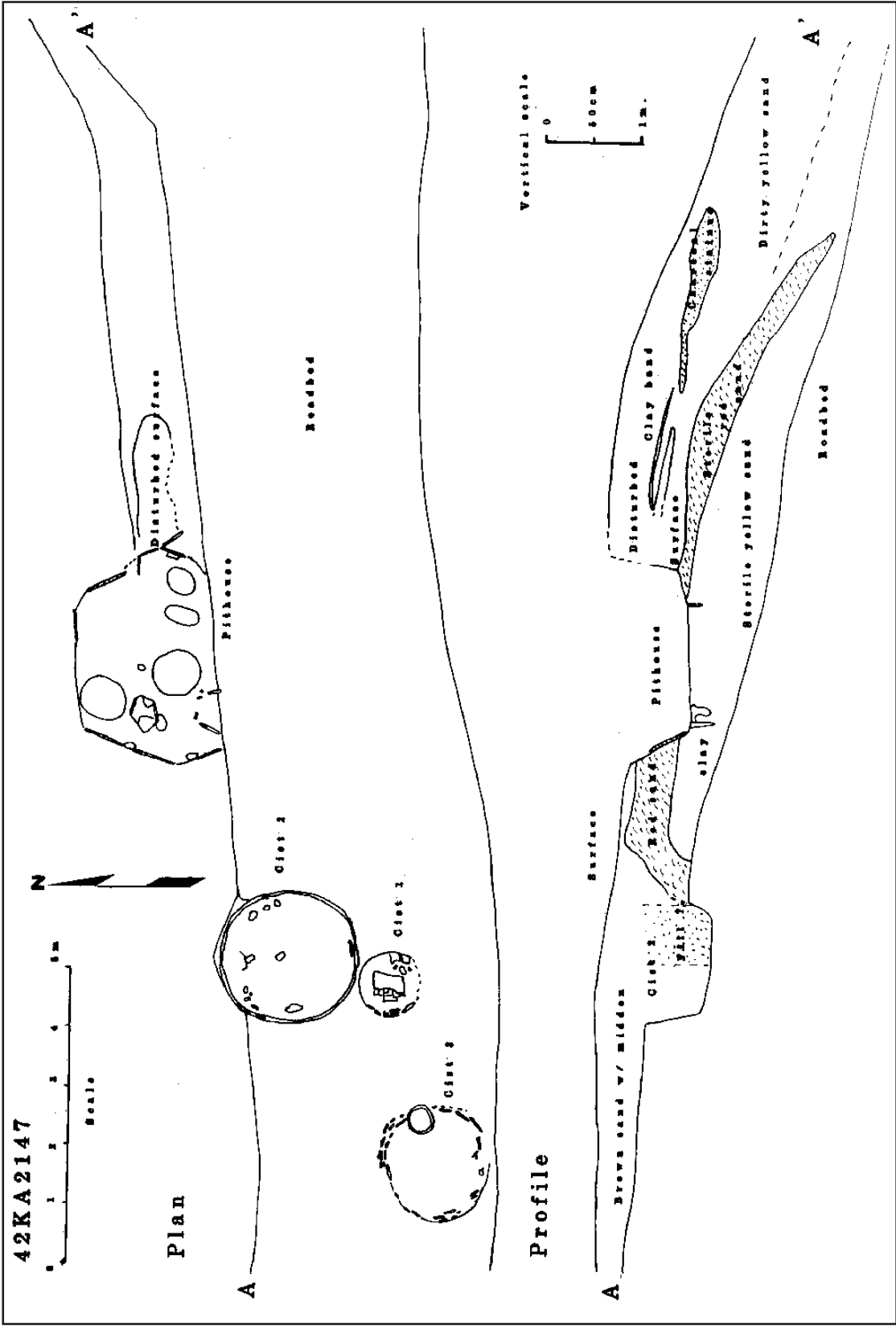


Figure 34. 42Ka2147, site plan and profile.

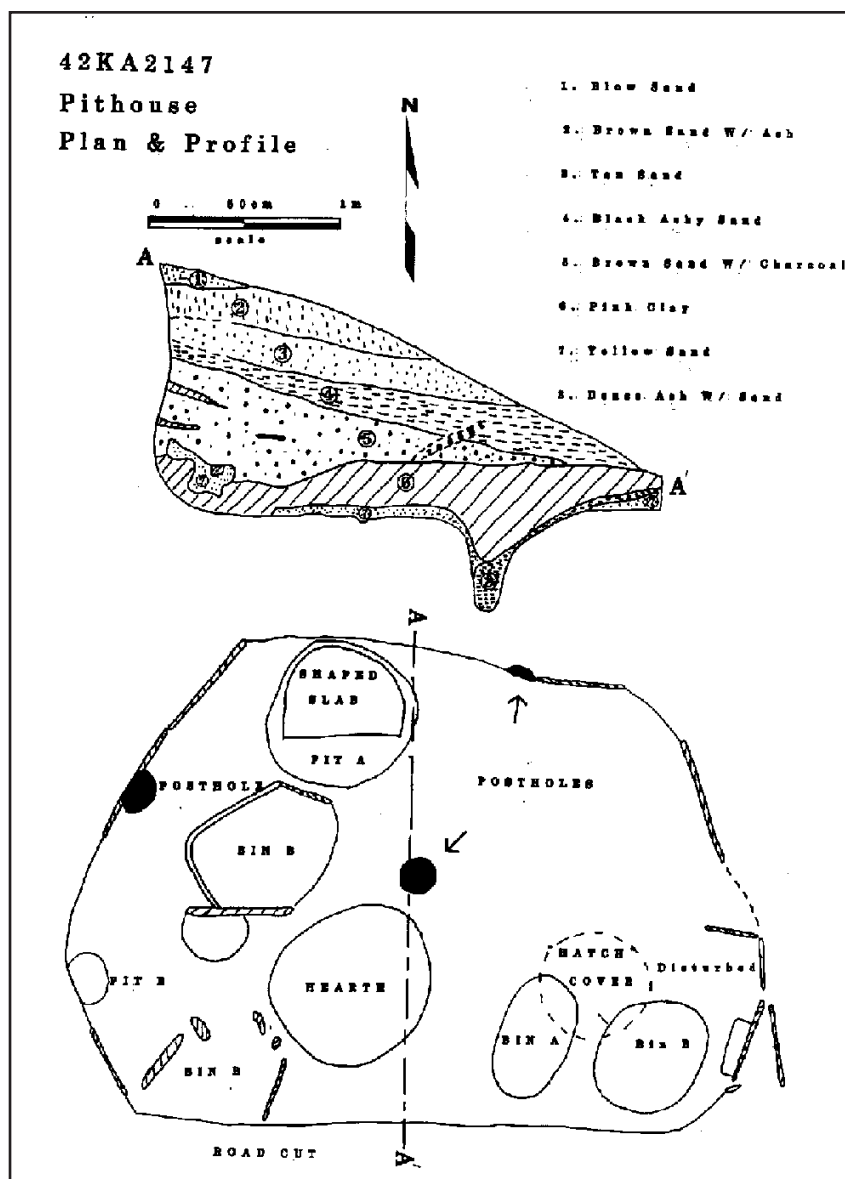


Figure 35. 42Ka2147, pithouse plan and profile.

was 110 cm. in diameter, only the floor and basal wall butts remained. The floor was slab-lined and surfaced with clay. Cist 2 was 2.3 m. in diameter, the road was cut to within 10 cm. of its floor. Floor construction, similar to Cist 1, was composed of fitted and overlapped slabs with two cm. of clay overlying it. The north edge of Cist 2 was actually within an undisturbed portion of the bank. Because only wall stub remnants were found here, it appears that the wall slabs had been pulled prehistorically.

Of particular interest is the function and construction sequence of Cist 3. This apparent storage structure is circular and 1.9m in diameter. Its depth extended 25cm. below the recently

trimmed road surface. Given the shallowness of the road cut at this point, it appears that it was either a very shallow structure or considerable erosion took place before the road was bladed. A well formed clay-lined hearth 46cm. in diameter appeared to be superpositioned over the east wall of Cist 3 (Figure 36).

This was interpreted to indicate that Cist 3 slabs had been prehistorically robbed (as was the case for Cist 2 and probably Cist 1) with the hearth later constructed over it. An alternative explanation, congruent with recently described "miniature pithouses" (see 42Ka3976) as well as early observations on cist/habitations by Steward

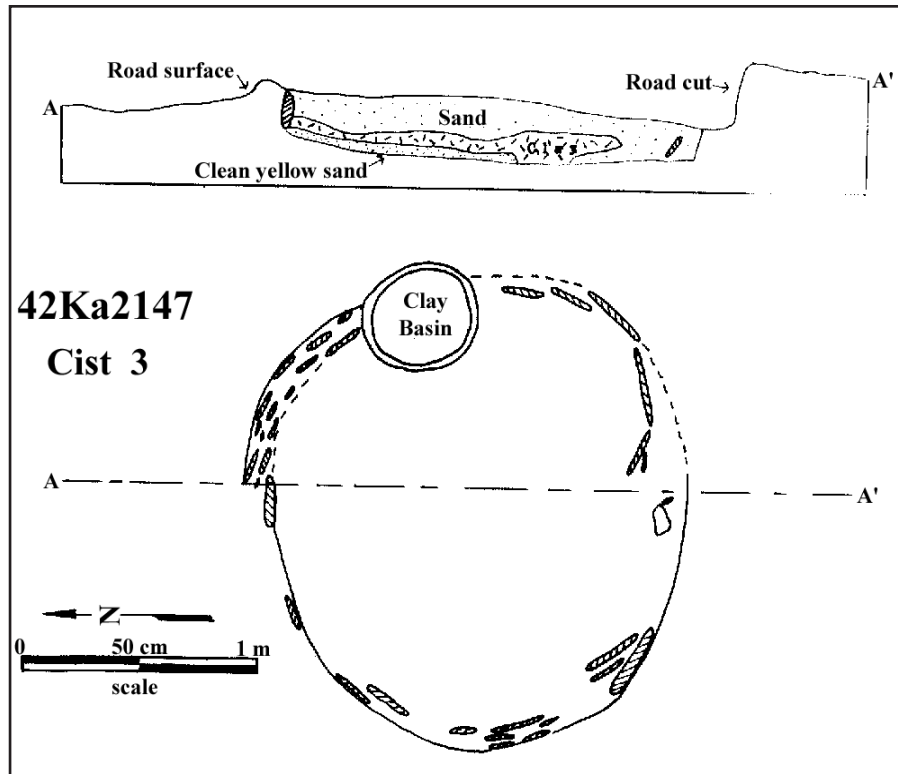


Figure 36. 42Ka2147, detail of Cist 3 and hearth.

at 42Ka1811 and Judd at Cottonwood Canyon Cave 6, is that the basin was actually integral to the structure and formed the base of a clay-lined hearth. Hearths incorporated into the east wall seems to be typical of these tiny pit domiciles (see Figure 102).

A small charcoal sample from Pit B in the pithouse yielded a conventional radiocarbon date of 1020 $\pm$ 200 B.P. and a 2 sigma range of A.D. 645 - 1315, 1345-1390. The early end of this range is in line with the impression of Basketmaker/Pueblo I architecture and the presence of a few Mesquite grayware sherds. Because the assay was from unidentified charcoal, there is a distinct possibility that the date is too old. A collection of deer metapodials were recovered from a deposit just above the roof fall. They ranged from unmodified, grooved and ready to split, as well as finished awls and could provide carbon for a more reliable date (Figure 37). These tools are also a comment on the availability of mule deer and hunting success in Johnson Canyon during this period of time (see Table 27).

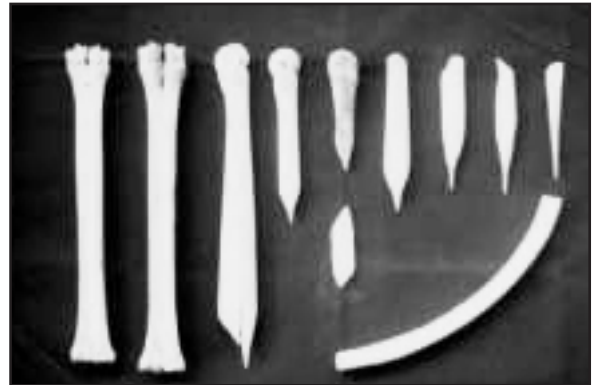


Figure 37. 42Ka2147, deer metapodial stock and completed bone awls.

42Ka2662

This “village” site consists of 10 or 12 concentrations of cobbles and debris thought to represent structures distributed over a steep south to west aspect sandy slope. The site lies at an elevation of 5,600 feet overlooking the broad alluvial plain of Johnson Wash. Downstream a similar setting occurs known as “Dry Lake”, suggests that these expanses of alluvium were, at least at times, well-watered and suitable for agriculture.

The concentrations average about five meters in diameter and associate with a moderate scatter of Virgin series plain gray ceramics including Mesquite Gray and a single sherd of Mesquite Black-on-Gray. Structural evidence included fire-hardened daub with small stick impressions in one concentration and tan clay (similar to that in Johnson Wash) is visible in others. No upright perimeter slabs are visible. Lack of tabular stone in general suggests that storage cists were not a common feature on site.

Richard Thompson (1984) identified this site

during a Section 106 compliance inventory for upgrading Kane County Route 136. Three other sites were recorded including 42Ka2667, the Dead Raven site, which was partially excavated and summarized in this volume under the Early PII descriptions (Walling and Thompson 2000).

Structure 1. As part of mitigation on 42Ka2662 a trenching program in the disturbed deposits within the r/w revealed a shallow, roughly circular gray clay surface with a few small tabular upright around the perimeter. The shallow pit structure had four floor features: a slightly off center hearth lined with three slabs; a heat altered floor depression 75cm in diameter, 10cm deep; a floor depression 60x75cm, 8cm deep; and a partially slab-lined bin 50cm in diameter (Figure 38).

An analysis of a floor contact macrobotanical sample by Kathleen Hearth (n.d.) yielded total of 2 charred seeds: one *Zea mays* cob fragment and one *Chenopodium* sp. Unburned organic material included *Juniperus* sp. Budscale (1), *Artemisia* sp. Leaf (1) and *Chenopodium* sp. (2).

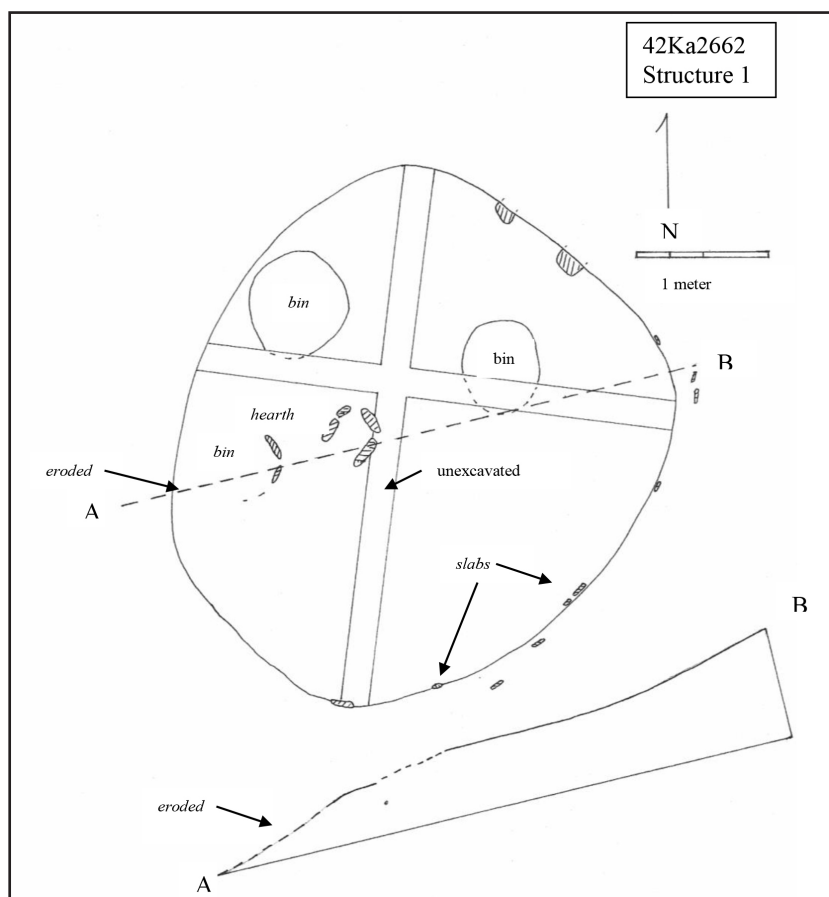


Figure 38. 42Ka2662, Structure 1 plan and profile.

Thompson suggested that the structure was a simple brush construction most suitable for temporary use and that the cluster of features upslope may be similar. Also notable was the lack of evidence for storage cists. He concluded that if the structure was a seasonally occupied fieldhouse, winter habitations with storage would occur elsewhere (Thompson 1984:5). "Light pithouses" (a term I attribute to Steve Simms for coining), with their relatively low investment of labor and connotation of seasonal use, have rarely been considered an important part of Virgin settlement. They have, however, been identified in both the uplands of the Grand Staircase and the St George Basin.

42Ka 4309 Hog Canyon Alcove

The sole features in this well protected but shallow alcove are a series of six storage cists excavated into Navajo Sandstone bedrock (Figure 39). Although incised "awl sharpening" grooves occur on the back wall, the lack of artifacts, deposits of any depth, and cultural debris suggest it functioned primarily as a repository.

Two of the cists have substantial encircling masonry walls: Cist 2 has seven or eight remaining courses of masonry which is plastered on the interior; Cist 3 also has remnants of a masonry superstructure which appears somewhat cruder and incorporates several upright slabs (see 42Ka5579 for similar construction). Associated daub has stick and beam impressions of various sizes suggest jacal was used for roof construction. No rock, daub or other evidence for masonry superstructures occurs in or around the other cists. The vertical walls of the bed rock pits display no evidence of digging stick marks or excavation techniques. While time consuming, the effort to excavate these impermeable features was probably not difficult; however, sealing the opening properly would have been critical.

Estimated cist volumes are provided in Table 8. A conservative estimate of mean volume for the

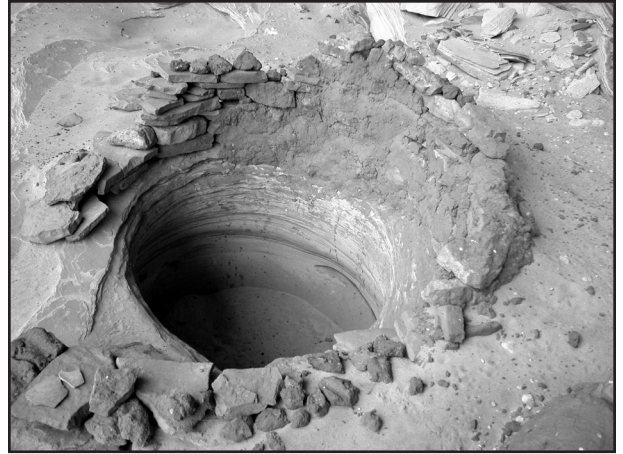


Figure 39. 42Ka4309, "Bed rock" storage cist 2.

best preserved cists (1-3) is 2.4 cubic meters. These capacities are consistent or exceed cists located on residential sites (see Table 28).

The site was selected for dating because of its distinctive bedrock cist architecture and because it was aceramic and potentially Basketmaker II. These structures are only known to occur in sheltered sites on the Grand Staircase and are virtually all excavated into the relatively soft Navajo Sandstone Formation. Apparent Basketmaker II examples occur in Johnson Canyon (see 42Ka2548, 42Ka3575). Its location above a spring fed riparian area, a setting favored by BM II agriculturalists in the Kanab area, suggested that the shelter was used to temporarily store maize during that period.

Cists with masonry collars were thought likely to be a later development. Corn husk fragments in the matrix of adobe associated with the collared cists were selected to date the actual structure with the precision usually restricted to maize cobs. The material was AMS dated A.D. 640 to 770 (Beta-194328) with a calibrated midpoint of A.D. 670. It is conceivable that these individual cists were initially excavated during Basketmaker II times and continued to be used, in one configuration or another, into Pueblo I times.

	Diameter	Depth	Superstructure	Estimated volume
Cist 1	135cm diameter	Unknown 1m+ (1 m est.)	None	1.43 cubic meters
Cist 2	140cm diameter	120 cm (minimum) (125cm est.)	Masonry, 90cm (minimum)	1.85 cubic meters
Cist 3	130cm diameter	70 cm + (1m est.)	Masonry (unknown height)	1.33 cubic meters
Cist 4	120cm diameter	80 cm+ (1m est.)	None	1.13 cubic meters
Cist 5	80cm diameter	Unknown (50cm est.)	None	.25 cubic meters
Cist 6	80cm diameter	20cm to sand fill (50cm est.)	None	.25 cubic meters
				Total 6.24 cubic meters

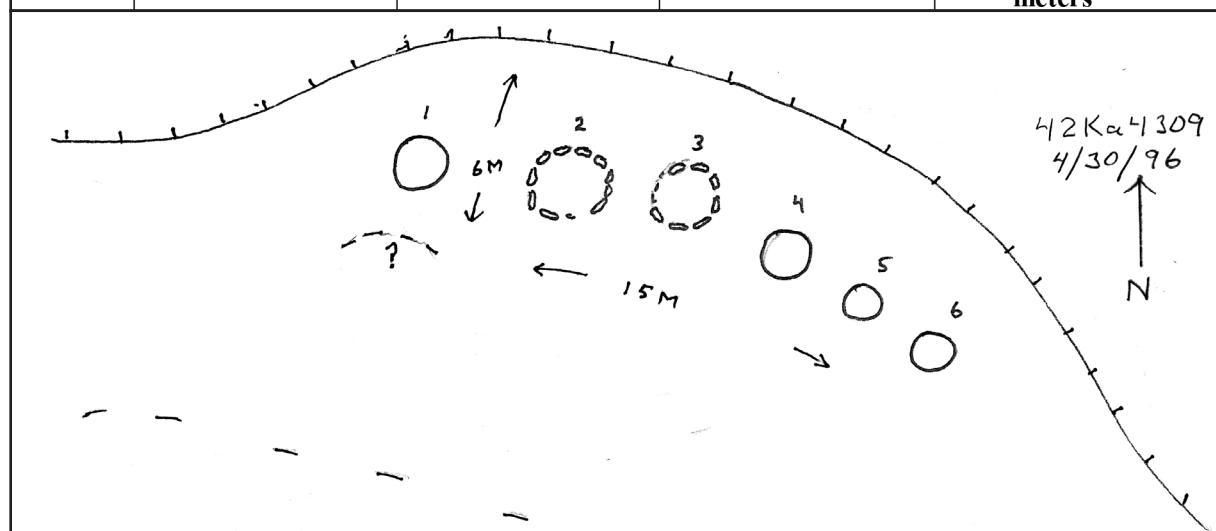


Table 8. 42Ka4309 cist dimensions and estimated volumes (upper); site illustration (lower).

42Ka1695, Hell Dive Alcove

This is one of the few major alcoves in the Cottonwood Canyon drainage system that Neil Judd did not describe (Figure 40). Hell Dive is a northeast aspect alcove near a spring at an elevation of about 6200 feet. It is located above a narrow, steep canyon unsuitable for agriculture; the mesa top is extensive blow sand and slickrock and seems less than ideal for agriculture. The most visible features on site are a series of variously colored pictographs on the back wall (Figure 41) and several dozen grooves, pecked cupules and connecting lines on several boulders (Figure 42). The original 1969 site form made no mention of any architecture or cists. Lack of habitation features, from any period, is probably a result of the shelters northeast aspect.

A site form update conducted in 2004 noted

pole impressed adobe and a scatter of tabular sandstone. Repeated looting episodes, and perhaps cattle trampling noted by Judd on similar sites beginning prior to 1969 and continuing until recently, appear to have destroyed most, if not all, evidence of architecture.

A single radiocarbon date from a surface corn cob was collected from the surface in 2004. The cob dated A.D. 650-880 (Beta 150671) with a calibrated midpoint of A.D. 700. Several (6) timbers found on the surface were submitted to the Laboratory of Tree-Ring Research for dating. Jeffrey Deans response "Unfortunately, none of the samples could be dated even though they were tried against several nearby master chronologies ranging from 500 B.C. to present"(Kanab files letter 3/19/2004). The potential for them to predate the master chronology seems slim but conceivable.

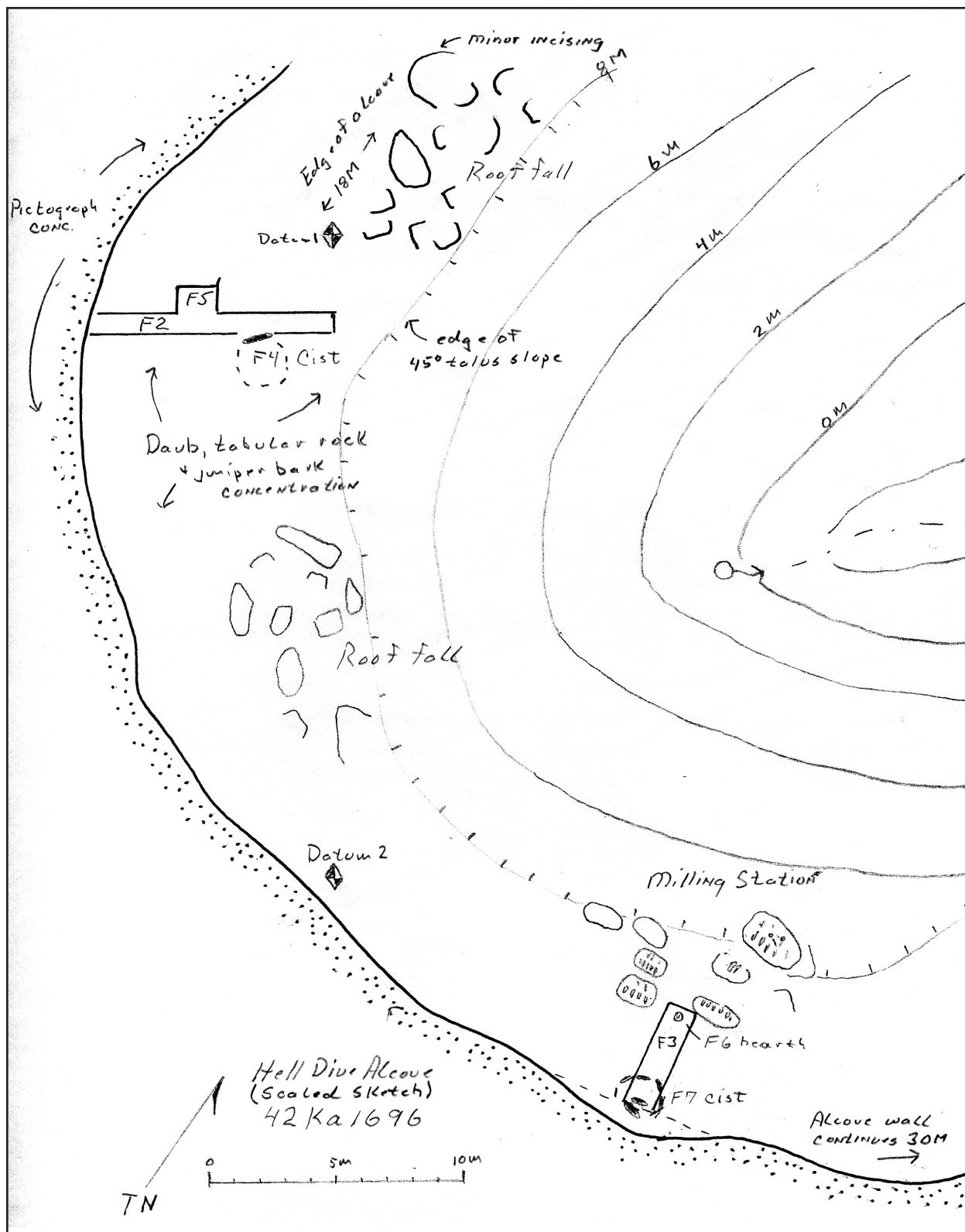


Figure 40. 42Ka1695, Hell Dive Alcove plan map.

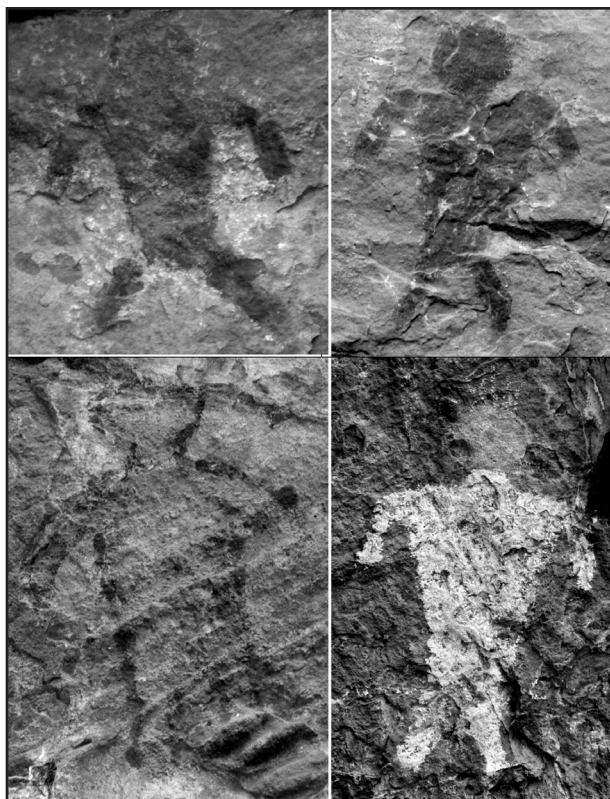


Figure 41. 42Ka1695 pictographs.

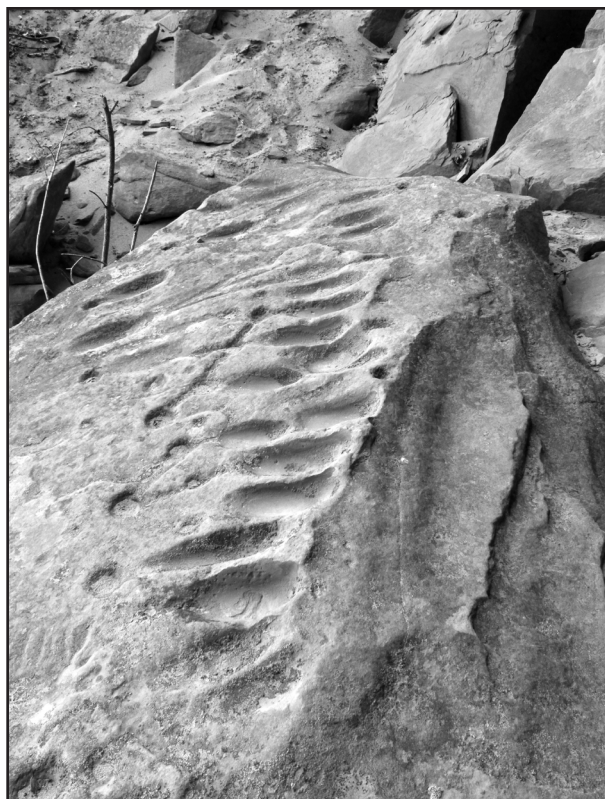


Figure 42. 42Ka1695, ground slicks, grooves, lines, and cupules on boulder.

In the spring of 2012 Cedar City District Archeologist Nate Thomas and a group of BLM professionals and volunteers undertook a general cleanup, testing, and mapping program for the site. The testing yielded a large quantity of corn cobs in a sandy matrix of husks and oak leaves not unlike what Judd (1926) and Nusbaum (1922) described in Basketmaker shelters. This suggests that a primary activity was processing, if not storing, maize. Storage cists are not obvious on site but testing did encounter the presence of at least one and indications of others. A small swatch of unidentified textile was also recovered.

Dozens of pictographs in red, white, ochre, and turquoise occur on the back wall of the shelter. Most anthropomorphs fall into two or three basic styles: the curvilinear “dough boy” c.f. South Fork and Cave du Pont and a few with triangular torsos reminiscent of the Cave Valley style, some with formal headgear (Figure 41). While the “doughboy” figures tend to be simple, gracile forms, they too can have ear bobs, headdresses and in one case a turquoise torso outlined in yellow ochre. Superpositioning of images is not uncommon and in general placement of the

figures seem to be random - possibly depending on the suitability of the sandstone which is rough and exfoliating in places. While the panel has not been analyzed in detail, a hint of style change from the curvilinear to the linear is apparent. Given the variety of pigments used in general and in some cases on a single image, it seems likely that some may have used organic based compounds suitable for AMS dating.

Milling slicks and pecked cupules with connecting lines on sloping surfaces as well as horizontal surfaces are abundant on boulders at the east end of the shelter (Figure 42). Incised lines, possibly suitable for awl sharpening are also common. So-called “axe sharpening” grooves are common in sheltered BMII sites elsewhere in the Kanab Creek, Cottonwood Canyon and Johnson Canyon drainages. A detailed study on these features might help determine their function. Pigment matching the turquoise colored anthropomorphs was observed on site. Hell Dive Alcove offers an excellent chance to interpret the function of these phenomena. Potential functions of these features include: processing pigment for the variously

colored pictographs - and perhaps additional uses; tool forming i.e. manos, axes and their maintenance, processing maize and other food stuffs. At any rate, along with the production of rock art images, they represent a fairly intense, long-term, activity on this site.

42Ka5579, Bay Bill Shelter

This shallow but well protected west alcove functioned primarily as a storage site (Figure 43). Six cists, cut into Navajo sandstone bedrock, are arranged in a line against the back of the shelter. A group of three on the north are simply pits with no superstructure; three contiguous cists on the south have masonry upper walls resting on the edge of the pits that extend their average depth to nearly 2 meters.

Where the edge of the excavated pit shallows as a result of the sloping bedrock shelf, large slabs have been used to form the pit (c.f. Judd's Cave 1, Room 1). Masonry consists of small, flat rock with large amounts of red mortar. Some mortar has small twigs and possibly corn husk binder (Figure 44).

Two other significant features occur on site. On the north end of the shelter is a cave measuring

4m deep, 1.5m high and 2.5m wide with a 70cm diameter opening; apparently excavated, the cave was probably suitable for storage if sealed. On the south end of the shelter is a remnant of a slab-lined rectangular feature 2.25m long.

The shape and technique of construction for the cists with masonry superstructures gives the impression they are Pueblo I (see 42Ka4309). The bedrock pits could be earlier - as well as the cave. The down slope location of rectangular feature, as well as its shape, suggests it could be the terminal construction.

Although this site has AMS potential, it was not dated. Small organic materials, along with human hair were recovered from adobe matrix fragments. A Lino/Washington Black-on-gray ceramic design petroglyph design supports a late BMIII/Pueblo I occupation (Figure 45). A red big-handed anthropomorph is similar to an image found on a Pueblo I site (42Ka5909) in Hackberry Canyon east end of the Grand Staircase Section and also at nearby 42Ka1812, Judd's Cave 3 (Figure 45). In all, the site appears to represent a distinctive storage oriented, nonresidential, site type with a distribution extending at least from the upper Virgin River to the Paria River.

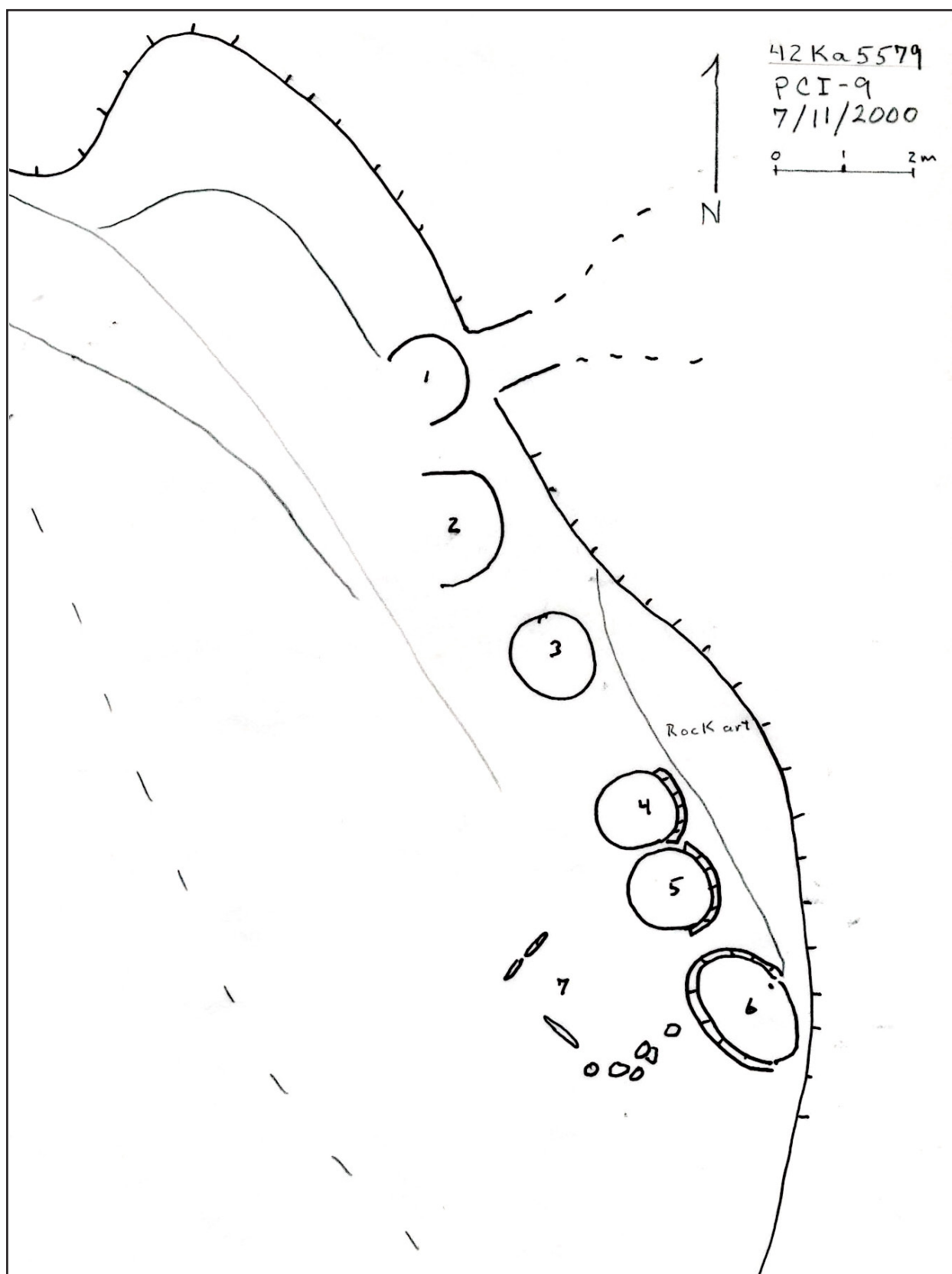


Figure 43. 42Ka5579, plan map.



Figure 44. 42Ka5579 cists.

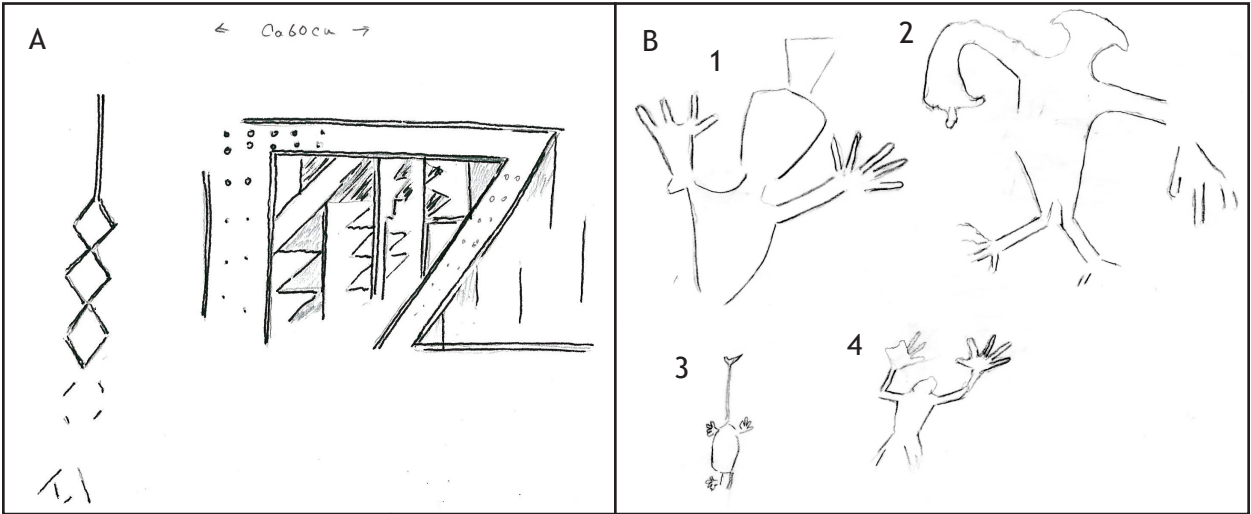


Figure 45. 42Ka5579, (A) Lino/ Washington style petroglyph; and (B) local anthropomorph style with similar figures from: (1) 42Ka 5909, (2) 42Ka5579, (3) Flower Cave (Judd 1926:Plate 60d), and (4) 42Ka1812.

PUEBLO I SITE DESCRIPTIONS

Antelope Cave NA5507 (Janetski and Hall 1983; Janetski and Wilde 1989)

Janetski and Hall (1983) report three radiocarbon dates for the Formative period from this deep, intensively occupied cave. Two samples of organic material were submitted to the Laboratory of Isotope Geochemistry at Arizona State University: *Zea mays* cobs from 20-30 cm below the surface yielded a date of 1190+/- B.P. (A-3510). A burned corn cob and sandal fragment which occurred together in Stratum 2 yielded a date of 1160+/-100 B.P. (A-3511). It is not known whether the C13/12 ratio was taken into account. A dendocalibrated age based on an average of the two is reported as A.D. 640-1030 (Janetski and Hall 1983:43).

42Ka4280 Park Wash (Ahlstrom et al. 2000)

This site is located along Park Wash at an elevation of 5,620 feet. Although it was recorded during a compliance inventory for a range re-vegetation project, it is also partially located within a county roadway. The site was excavated as part of the Grand Staircase Escalante National Monument's archeological salvage project of sites occurring in existing roads. The Park Wash Site is one of 21 early Puebloan sites recorded along Kitchen Corral Wash and its major tributaries Deer Spring Wash and Park Wash (as of 2000).

42Ka4280 is located on a minor rise extending west from the base of the canyon's talus slope. Surrounding the ridge is deep alluvium which is downcut 10 meters or more by Park Wash and also a small tributary located immediately north of the site. Slab uprights and a tabular scatter of sandstone appear to be randomly distributed east-west across the ridgetop. A few Mesquite (Lino) grayware sherds and one black-on-gray sherd in association with the cists suggested a Basketmaker III date.

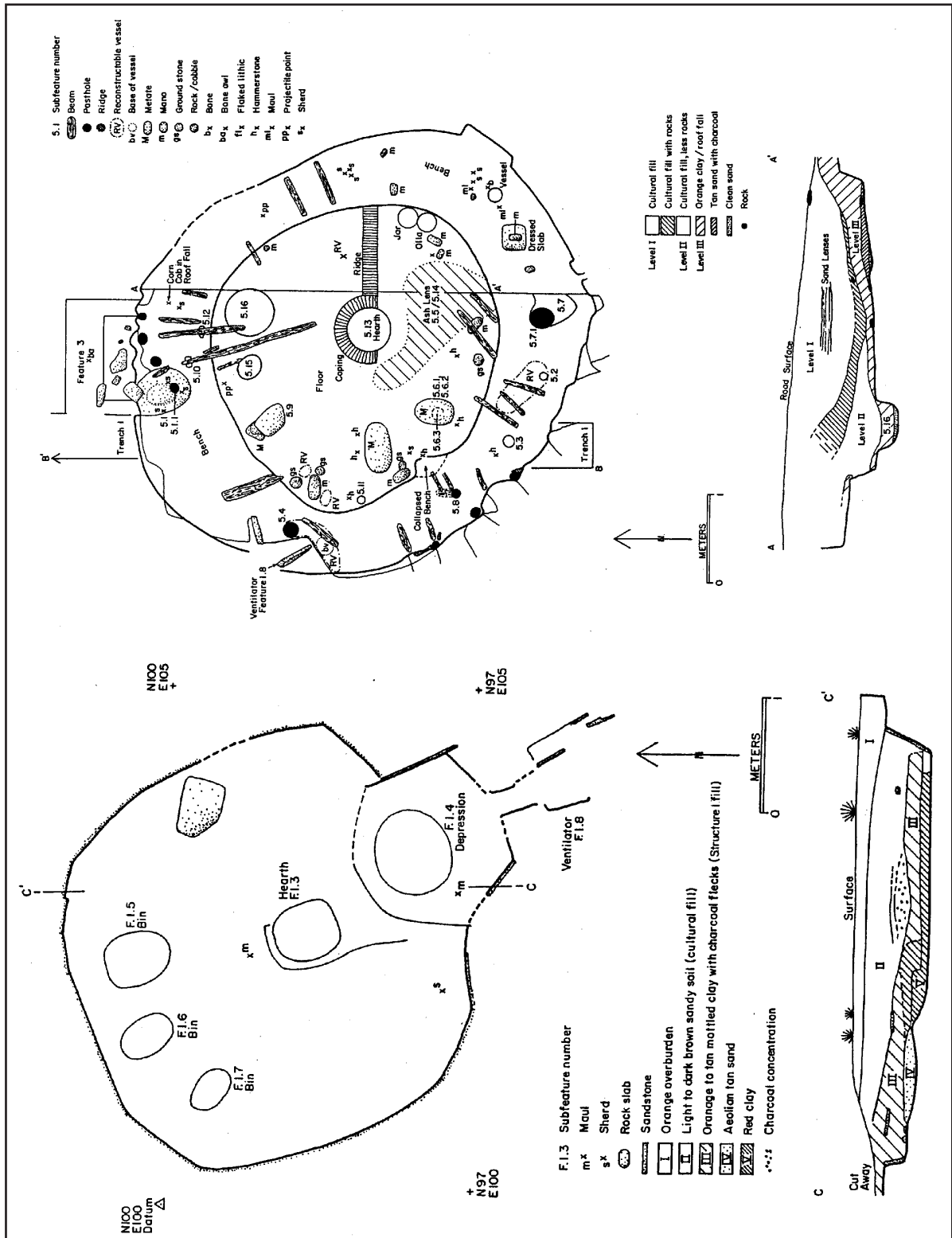
Pithouse Architecture.

Two partly superpositioned pithouses lying within the roadbed were excavated in the fall of 1998 (Figure 46). The earliest structure (F5) cut a use surface (F3), that indicated the presence of an even earlier occupation on the site (Ahlstrom, McFadden, and Roberts 1999:13).

The F5 pithouse was nearly one meter deep, cut into bedrock and encircled by a bench. The means of entry was not apparent, however it did not appear to have had an antechamber. A large number of artifacts were found on the floor including: one and two handed manos, several "puebloan short-stemmed points" (Figure 47) cf. Rose Spring/Abajo styles (Walling-Frank 1999) and several crushed grayware vessels (Figure 48).

Floor features included a shallow clay-coped hearth with a poorly defined "ash pit" consisting of laminates of sand and ash sloping upwards to the bench on the south and two sand filled pits on the north end of the floor just in from the bench. Much of the fill of the structure was midden debris consisting of both structural and artifact refuse thrown in after the structure had partially buried. The partial remains of an adult human lay directly on the floor of the structure (Roberts 2000).

Feature 1 is a shallow but well constructed slab-lined and benched pithouse with a southeast oriented recess and a narrow slab-lined vent shaft that extended out from the recess and over the fill of the F5 pithouse. Floor features included a clay-coped, deep, straight-sided hearth; a shallow ash pit between the recess and hearth; and a series of three sand filled pits, arranged in an arc just inside the front of the bench - all three had been sealed with floor clay. Very few artifacts were found on the floor indicating the structure had been cleared out prior to collapse. There was no evidence of its having burned. The upper fill of the structure was midden and included a variety of Pueblo I ceramics indicating that the site continued to have been occupied during that period (Perry 1999).



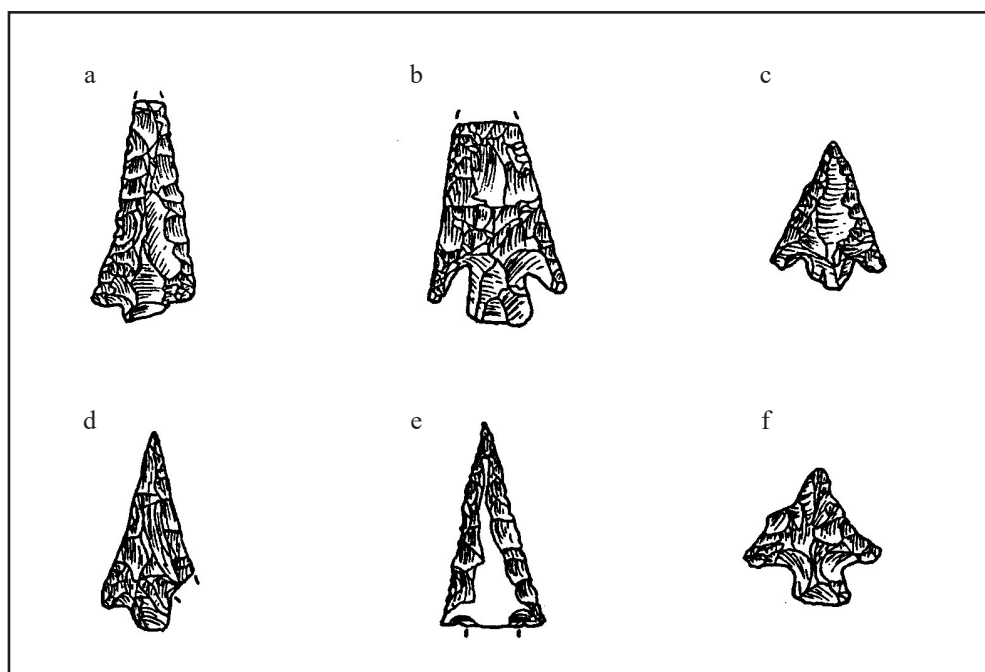


Figure 47. 42Ka4280, projectile points (b is 27 cm).

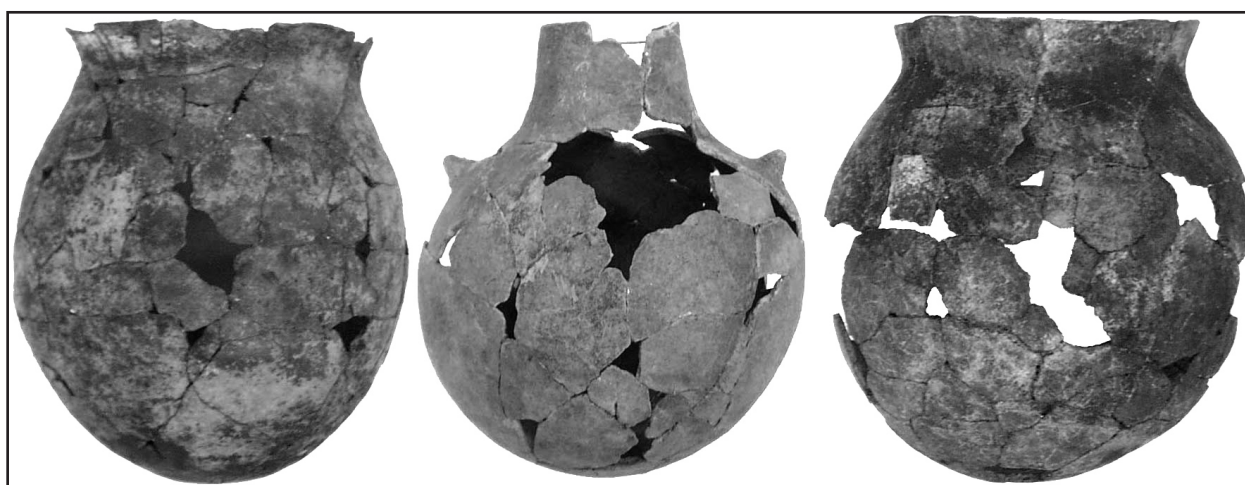


Figure 48. 42Ka4280, "local" refitted vessels (reconstructed by Jim Starr).

Dating

An AMS date on a small diameter wood pole laying on the bench of the earlier F5 pithouse yielded a calibrated date of A.D. 555 - 665 date at 95% probability with an intercept date of A.D. 630 (Beta-125911). Two pinyon timbers collected from this structure both yielded non-cutting dates of 725vv. These tree-ring dates provide a lower temporal limit for construction of the structure. Although there is no way to determine how many rings are missing, the fact that the two dates are

identical, suggests that A.D. 725 is close to the actual construction date of the F5 pithouse.

Charred corn from the hearth of the F1 pithouse yielded a 2 sigma AMS date of A.D. 680 to 885 (Beta 131667) with an intercept of A.D. 775. This date is congruent with the slightly earlier tree-ring dates obtained from the underlying F5 pithouse; it is also in accord with Pueblo I architectural style of the F1 pithouse. Pueblo I ceramics in the fill of the F1 pithouse indicate some form of continued use or occupation on the site after abandonment of the structure.

Interpretation

Both pithouses display formal architectural similarities with Pueblo I and early Pueblo II structures found in Johnson Canyon (42Ka1066, 42Ka2667), along Kanab Creek (42Ka1969), Cottonwood Canyon (42Ka1504) Little Creek Mt (42Ws1365) as well as the St George Basin (42Ws388, 42Ws1348 and 42Ws964). Typically these structures are about five meters in diameter, lined with sandstone slabs and encircled by a bench about one meter wide. The vent shaft is typically lined with slabs and oriented to the southeast. The small diameter of the vent shaft, and often the presence of a sandstone “hatch” cover on the floor, suggests that access into the structure was through the roof.

Floor features of Pueblo I pithouses are often distinctive; typically, there are two to seven sand-filled pits arranged in an arc around northwest quadrant of the floor. These unique features often hold a rock or slab and were usually sealed with clay patches. In alignment with the vent shaft, a shallow ashpit, a clay coped hearth, and sometimes a deep vault (also usually sealed) completes the typical floor feature layout. This assemblage of pithouse features forms distinctive layout that was in place by the early A.D. 700's eighth century and continued until late PII times.

Consistent with the formal Pueblo I pithouse architectural layout, ceramics also meet expectations for the period. Nominally an early form of Shinarump gray, the restorable vessels (Figure 48) represent stylistic forms that can be viewed as intermediate between Mesquite Gray jars of the Basketmaker III period (Figures 30, 31), and the globular jar with everted rims that dominate the succeeding Early Pueblo II Period (Dalley and McFadden 1985; 152, 153; Dalley and McFadden 1988; 237) and well represented at 42Ka6293 (Halgopian in Nash 2013).

42Ka4859 Road Kill

Like the nearby the Park Wash site, Road Kill was also partially excavated to mitigate damages and salvage data from on-going use and maintenance activities of the Park Wash road. The road has been in use since at least the early 1900's and was apparently the route Julian Steward followed in 1934 (Steward 1941). Steward recorded sheltered

sites (probably 42Ka4860) and Site 37 (since stabilized by Fiero 2001) located immediately above 42Ka4859. Steward did not comment on the presence of Road Kill, quite possibly it was not exposed at the time. These sites are of interest in terms of Kitchen Corral's settlement history and patterning but it is the contemporary Park Wash site that complements and contrasts with the Road Kill excavation. The investigations at Park Wash described two sequentially occupied pithouses, while Road Kill displays an accretionally constructed storage cist alignment (Figure 49). The presence of light jacale residential rooms abutting the cists suggests they were inhabited during the summer - the opportunity to pursue pithouses at Road Kill did not present itself.

Road Kill is located on the east side of the canyon at an elevation of 5,720 feet. It is situated at the base of a talus slope and extends a short distance out on to the alluvium of Park Wash. The Park Wash drainage is one of the two major intermittent tributaries feeding Kitchen Corral Wash. The canyon is nearly 100 meters deep at this point and is formed of the Springdale Sandstone Member of the Moenave capped by the Kayenta Formation. The canyon floor is a level expanse of alluvium approximately 150 meters wide. At present Park Wash is incised 8-10 meters deep; prehistorically the productivity of these well-stratified deposits would have varied according to the depth of the channel.

At the outset of the excavations the most obvious feature on site was the remnant of a slab-lined room exposed in the eastern cut bank of the road (F2) and several charcoal stained areas in the roadbed itself. Additional features on the west side of the road suggested a linear alignment of architectural features oriented northeast-southwest. Excavation within the roadbed, as well as excavation of features contiguous to those directly impacted, exposed a formally arranged alignment of slab-lined storage cists (F2, F8, and F26) each with a lightly constructed, shallow, residential room (F37, F11, and F15) abutting them on the south (Figure 50). The entire alignment may have consisted of seven or eight cists. Cist volumes are substantial and compare well with full-time, agriculturally oriented sites elsewhere (Table 25). The only feature excavated that was not directly associated with the alignment was an extra-mural hearth located to the south (F12).

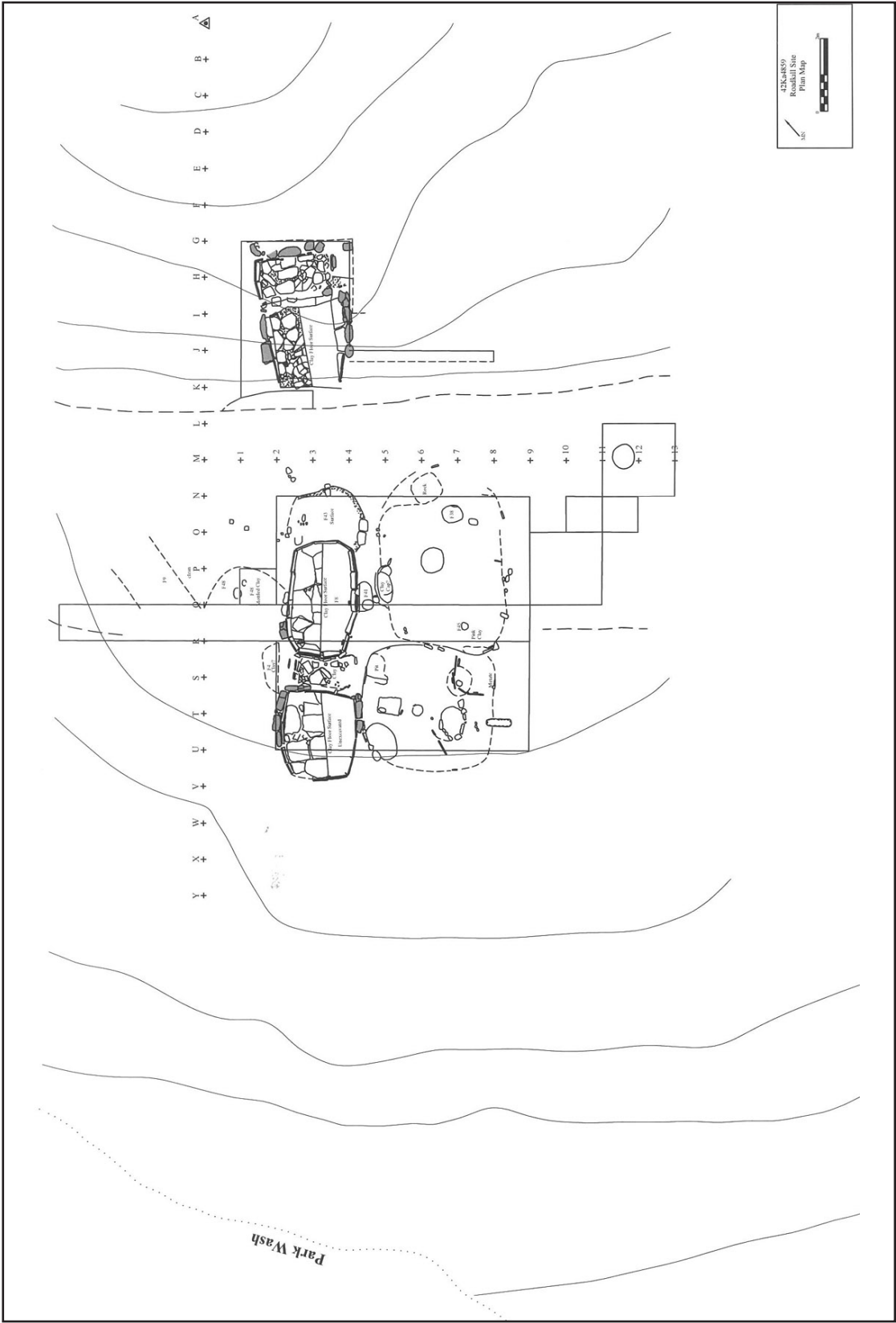


Figure 49. 42Ka4859, plan map.

Construction Sequence and Dating

Although the series of linked storage cists and their associated residential rooms formed a linear, south aspect alignment - ultimately a sort of "proto-roomblock", there is good evidence that they were not constructed at the same time. The graded road cut appeared to divide the alignment into two segments; one on the west extending out onto the alluvium, and one on the east extending upslope. Eventually, features underlying the road bed linked the two into a single alignment of cists fronted by residential rooms. Only minor stratigraphic evidence remained on site, but the construction sequence appears to have begun on the west and continued upslope.

West Segment. Of the excavated structures, Cist 1 (F26) appears to have been the initial construction in the alignment. The associated Room 1(F15) was likely constructed shortly after to form a storage-habitation "unit." Two radiocarbon dates on hearth charcoal suggest a BM III age of about A.D. 600-

650 (Table 9). A subsequent AMS date on seed from the hearth (Beta-179632) provided a slightly later date of A.D. 660-790 with an intercept date of A.D. 690. Charcoal from the midden-like upper fill of Cist 1 yielded a slightly later date of A.D. 670-990 (Beta-167443) with a calibrated midpoint of A.D.790. While this date slightly overlaps those from Room 1, the upper fill originated elsewhere on site and necessarily postdates the cists use.

The second storage-habitation unit consists of Cist2, Room 2, and several pit features (F41) that lie between them (Figures 49, 50). Cists 1 and 2 are connected with a slab surfaced connecting pavement that forms the proto-roomblock (Figure 51). Clearly aberrant is a BMII aged date on charcoal from the Cist 2 floor fill. Residential Room 2 hearth charcoal dated A.D. 580-880 (Beta-167438); a charred seed from the hearth fill provided a more precise AMS date of A.D. 640-770 (Beta-179632). This date is virtually identical to the adjoining Room 1 date. F41, a pit lying on the north edge of Room 2 that abutts Cist 2 and is

Sample # (Beta)	Location	Material	C12/13 ratio	Conventional C14 age	2 sigma cal. age	Intercept date
167438	FS 105 F25 hearth (Room 2)	charcoal (composite)	-25.0	1330+/-80	AD 580 to 880	AD 680
167439	FS 96 F8 floor (Cist 2)	charcoal	-20.9	2010+/-40	BC 100 to AD 70	BC 10
167440	FS 184 F40 hearth in profile	charcoal	-23.2	1910+/-40	AD 20 to 220	AD 90
167441	FS 205 F21 Hearth fill in Room1	charcoal	-25.0	1480+/-60	AD 430 to 660	AD 600
167442	FS 204 Room 1 hearth fill (lower)	charcoal	-25.0	1400+/-80	AD 530 to 780	AD 650
167443	FS 153 Cist 1 fill	charcoal	-25.0	1210+/-70	AD 670 to 990	AD 790
167444	FS 214 F41 pit fill	charcoal	-25.0	1400+/-60	AD 550 to 710	AD 650
179630	F40 hearth in F37 profile	seed	-10.8	1230+/-40	AD 690 to 890	AD 780
179631	F25 hearth in F11Room2	seed	-10.3	1340+/-40	AD 640 to 770	AD 670
179632	F21 hearth in F15 (room2)	seed	-11.6	1300+/-40	AD 660 to 790	AD 690
179633	F12	seed	-10.9	1300+/-40	AD 660 to 790	AD 690

Table 9. 42Ka4859, Radiocarbon dates from the Road Kill site (note charcoal and seed series).

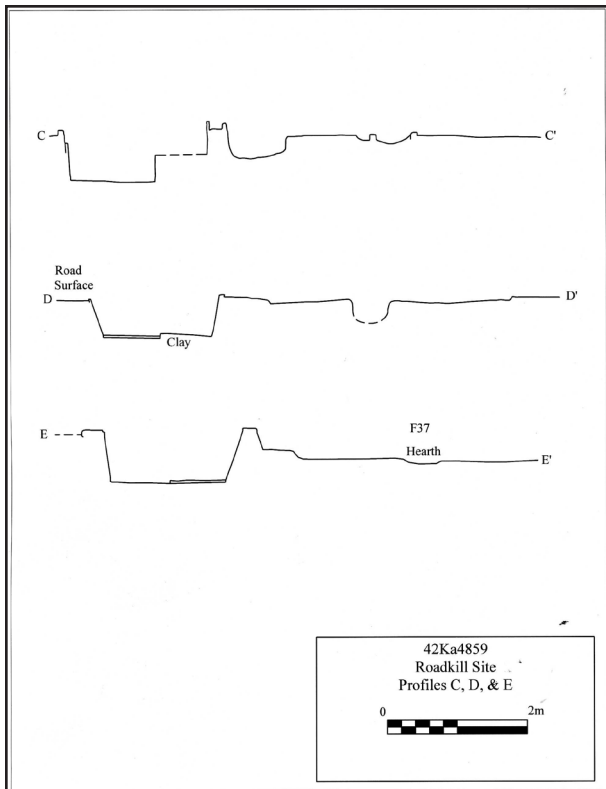


Figure 50. 42Ka4859, cist-room profiles.

clearly associated with one or both features, yielded a date of A.D. 550-710 (Beta-167444) on charcoal which is congruent with the Room 2 hearth dates. Although there was only minor evidence of superpositioning that suggested Room 2 was built after Room 1, it seems likely that they were built in sequence. The connecting pavement between Cist 1 and 2 clearly indicates they were in use at the same time, the same cannot be said for residential Rooms 1 and 2.

The portion of the road bed between the east and west segments was largely cut away by road grading. There was, however, a sealed floor pavement abutting Cist 2 which suggests a third cist in the West Segment sequence (Figure 49).

East Segment. Although a gap of 2 meters separated this portion of the site from the West Segment, it continues the alignment upslope and consists of a nearly identical layout of cists, a connecting pavement, and an apparent residential room visible in profile (Figure 49).

Cist 3, although perhaps 1/3 cut away on the west, is slightly larger than Cists 1 and 2, is rectangular, and has several courses of masonry



Figure 51. Cists 1 and 2 with connecting pavement, view to east.

superstructure remaining (Figure 53). On its east is a connecting pavement abutting a probable cist that was not explored. A large dressed slab forming part of the east wall suggested it had been recycled from an earlier feature, adjacent to it a missing slab appears to have been “pulled” (Figure 53). No suitable carbon occurred on the floor for dating.

Extending to the south of Cist 3 is a 4 meter long surface with an unlined hearth (F40) exposed in profile (Figure 50, 53). Initial dating of charcoal from the hearth yielded a date of A.D. 20-220. The second round of AMS dating on a charred seed dated the feature, and by association Cist 3, A.D. 690-890 with a calibrated midpoint of A.D. 780 (Beta 179631). Slightly later than dates from the West Segment, this date and the associated architectural data, suggests that the progression of the cist alignments construction began on the west and progressed upslope to the east - a process that seems to have occurred over multiple generations.

An extramural, slab-lined hearth (F12) containing charred maize occurs a few meters south of the residential rooms (Figure 49). Although cut away from any demonstrable association it yielded



Figure 52. Cist 2 - Room 2 suite, facing NW.



Figure 53. Cist 3 detail view to east. Note missing “pulled” slab on left, dressed (recycled?) slab on right, connecting pavement and contact with room surface (Figure 50, Profile E) on right.

an AMS date of A.D. 660-790 (Beta-179633) congruent with any, or all, of the dated features.

Ceramics

Roger Mc Peek’s analysis of 1,483 sherds recovered from the site included Shinarump (25%) and Virgin series (75%) types. Because both series had similar sand temper, frequently there was little to distinguish between the two except for paste color. Perry had similar difficulties with the Park Wash assemblage (Perry 2000). Jar rim forms were gently curved consistent with Basketmaker and Pueblo I forms (see 42Ka1796); no Early PII everted styles occurred. The two refitted jars from the Park Wash site BMIII pithouse (Figure 48) seem to display a little more rim eversion than the small Road Kill sample.

The relatively few, generally small, sherds with design elements occurred only on the lighter pasted Virgin series assemblage. They included Washington Black-on-Gray and a few “transitional” styles leaning both towards earlier Mesquite Black-

on-Gray as well as later St George Black-on-Gray. In general, the Road Kill pottery was not temporally sensitive enough to be helpful determining the roomblock construction sequence. A single apparent Abajo Black-on-Red sherd was found in F41 but there is no suggestion of significant contact with groups outside the Virgin region.

Artifacts

The artifact assemblage suggests a variety of maintenance, ritual, and subsistence activities took place on Road Kill - a finding consistent with its interpretation as a primary residential site. Projectile points (12) compare well with those at the Park Wash site. A grooved maul, turquoise pendant, a bead, stone pipe (as well as a fragment) are among the more exotic artifacts recovered (Figure 54). Abundant hammerstones, abraders, both single and two-handed manos, scraper and biface fragments, a significant number of metate fragments, and considerable lithic material make up the more mundane assemblage.



Figure 54. 42Ka4859, selected projectile points.

Radiometric Dating

The initial series of radiocarbon dates were run for each of the major features that yielded charcoal to determine the temporal relationship between the residential rooms and the cists and their construction sequence. These dates appeared to be satisfactory although two were clearly too early. Aberrant dates such as these are typically attributed to “old wood.” This may be the case, but they do fall within the range of BMII and may suggest of an earlier unidentified occupation. A second series of AMS dates was run on charred seeds that improved the accuracy of the initial series and provided additional evidence that the east segment was more recent than the west (Table 9).

Discussion

The construction sequence of the roomblock and clear association of the light jacal habitation rooms suggests a progression of habitation/ storage units originating on the west and added onto over time. Linking of cists with connecting “pavements” or use areas into what might be described as a “proto-roomblock” is a trait described on the Little Man Pueblo I site in the St. George Basin (Dalley and McFadden 1985). The light habitation rooms also have precedents in the St George Basin and elsewhere on the Grand Staircase (see 42Ka2662, 42Ka2667). These habitation rooms contrast with the Park Wash site which, while also a BMIII/ PI sequentially occupied site, employed pithouse domiciles. It is entirely possible that similar pithouse features occur in the undisturbed portions of Road Kill.

42Ka4860 One Wall Shelter

This small, west aspect, sheltered site holds the remnant of a storage room and an cleared occupation surface. The site is located near the Road Kill site along Park Wash and immediately above arable bottomland at an elevation of 5,800 feet. The “D” shaped cleared space measures 5m. x 3m. and is bounded by drylaid masonry, although some there is some mortar present.

The single remaining wall remnant is a little over one meter high and extends to the ceiling of the shelter. Construction of the wall is a combination of masonry and stick impressed adobe – a technique that is common during the Pueblo I period (c f. Neaf Spring, Nipple Alcove, Judd’s Cave 1). The wall displays multiple coats of plaster and the entry had been reworked (reduced in size) indicating use of the structure over a period of time. A small twig from the matrix of adobe yielded a two sigma range of A.D. 705-910, 920-955 (Beta-134478). The calibrated midpoints of A.D. 815,840 and 855 indicate it construction during mid Pueblo I times.

One Wall Shelter appears to have been a storage locus with short-term, probably seasonal, occupation. Whether the site was in use while 42Ka4820 was occupied seems doubtful given its slightly later date. Its limited facilities suggests it may have functioned as part of an alternative, more mobile, subsistence strategy employed during Pueblo I times.

42Ka3360 Rock Springs Bench Hamlet

This is the only structural site presently recorded on Rock Springs Bench. It is located on a north aspect slope with sandy, loam soils at an elevation of 5,940 feet. Architecture consists of a 15 meter long linear alignment of slab-lined rooms oriented southwest-northeast with a 3 meter diameter slab-lined structure on the east end; to the southeast is a midden and potential for a buried pithouse. A dense scatter of North Creek Gray and a few Washington Black-on-Gray sherds (no Shinarump identified) occur over the site.

A calibrated radiocarbon intercept date of A.D. 885 comes from an assayed timber found in the fill of a looted room; the 2 sigma range is A.D. 600 to 1000 (RL-2084). The date confirms the initial impression, based on architecture and ceramics, that the site was occupied during the Pueblo I period.

42Ws1365 Little Creek Mountain

This site is part of a dense occupation on Little Creek Mt that spanned the Basketmaker III - Late Pueblo II periods. Excavation and inventory on the mesa was carried out by the Southern Utah University field school (Lyneis and Thompson 1979; Heid 1979, 1982).

The slab outline of this shallow pithouse was exposed, via sheet erosion and minor looting, in 1983 permitting its excavation with virtually no disturbance to the remainder of this substantial site. Excavation of the structure was considered a protective measure against immanent looting.

Site Layout

An unusually substantial rubble mound defines a roomblock lying immediately north of the pitstructure. Some question existed as to whether the two features were actually contemporary; no stratigraphic relationship existed and only the presence of Pueblo I style ceramics and positioning associate the two features.

Pithouse Architecture

The shallow interior pit of the structure was slab-lined and had an encircling surface or "bench" that originated at, or about, the site's occupation surface (Figure 55). It is assumed that a series of roof supports were located on the bench, although none were encountered (see 42Ka4280, F5 pithouse for a similar phenomena). Large amounts of fired, stick-impressed daub in the fill indicated the superstructure had burned. Floor features were typical for the period and included: an ash pit, clay lined hearth, and vault aligned with the vent shaft. As excavated, the vent shaft was a shallow, sand stone lined, trough-like affair oriented to the southeast. Notable, and typical of the period, was an arrangement of five sand filled bins arranged in an arc around the northwest edge of the floor. Each had a sandstone slab placed in the fill and was sealed with floor clay. Aikens (1965) was the first to note and speculate about these features at Bonanza Dune. Their spatial and temporal distribution are discussed in the concluding section.

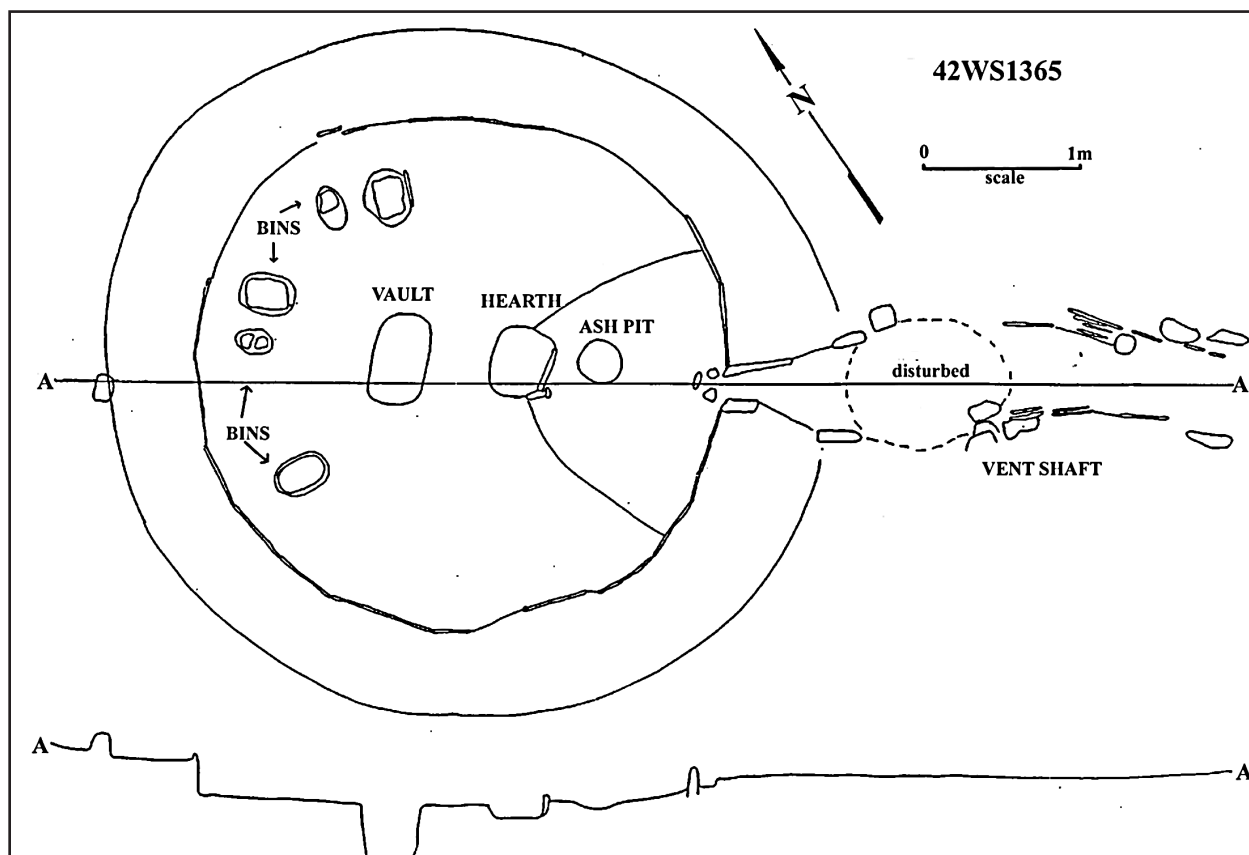


Figure 55. 42Ws1365, pithouse plan and profile.

Dating

Floor contact charcoal (F8) yielded a 2 sigma date of A.D. 690-970 (Beta 10845) with a calibrated midpoint of A.D. 855. This date conforms with both the architectural expectations for Pueblo I pithouses and the North Creek Gray pottery.

42Ka1504 Cottonwood Canyon Cliff Dwelling (Pueblo I component)

This substantial late Pueblo II site is located in a tributary of Cottonwood Canyon and was reported by Judd(1926) as Cave 6. The Cottonwood Canyon drainage system is a reliable source of water and until recently provided the Town of Fredonia Arizona with culinary water from its numerous springs. Although Judd conducted no excavations at the site he describes it as "the largest Cliff-dweller settlement visited by the writer during his archeological observations north of the Rio Colorado (Figure 56). Altogether 19 rooms and 1 possible kiva are in evidence" (Judd 1926:114).

In 1966 the site was stabilized by G.N. Keller of Utah State University (Keller 1966). At that time, he reported that there was no evidence of the kiva. In 1988 the Kanab Resource Area carried out a second program of stabilization under contract (Tipps 1989). Coordinating with the stabization crew, the kiva depression was excavated by BLM archaeologists. Fill of the structure held abundant artifacts including perishables but was disturbed throughout. Shovel impressions on the floor indicated the structure had been completely looted

and then backfilled. The investigation of the kiva did however allow for its description (see Late Pueblo II site descriptions) and also yielded evidence for the previously unrecognized Pueblo I occupation described here.

Pueblo I Architecture

Removal of the looters fill beyond the limits of a recess on the north side of the kiva revealed a remnant of an earlier pithouse surface that had been cut by the prehistoric excavation of the kiva pit (Figures 73, 74). A curving alignment of sandstone slabs defined the interior of a shallow pit surrounded by a clay surfaced bench which lay at about the level of the later occupation surface. Judd's Room 12 had been constructed over a portion of the bench. The floor of the pithouse was prepared clay; the only remaining floor feature was a small pit partially cut away by looters (c.f. sand-filled pits). The pit was approximately 50cm. in diameter, 25cm. deep, and had been sealed with about 3cm. of floor clay which lay over a closely fitting sandstone slab. Between the clay and the slab was 3cm. of clean sand; fill beneath the slab was an organically stained brown sand overlying pockets of clean, yellow sand. No ceramics or artifacts were in association with the pithouse.

The possibility of an earlier occupation was not entertained by Judd and was an unexpected consequence of excavating the kiva. In hindsight, the numerous granaries and rooms set against the back of the alcove suggest a longer, more complex site history than simply the Late Pueblo II occupation.

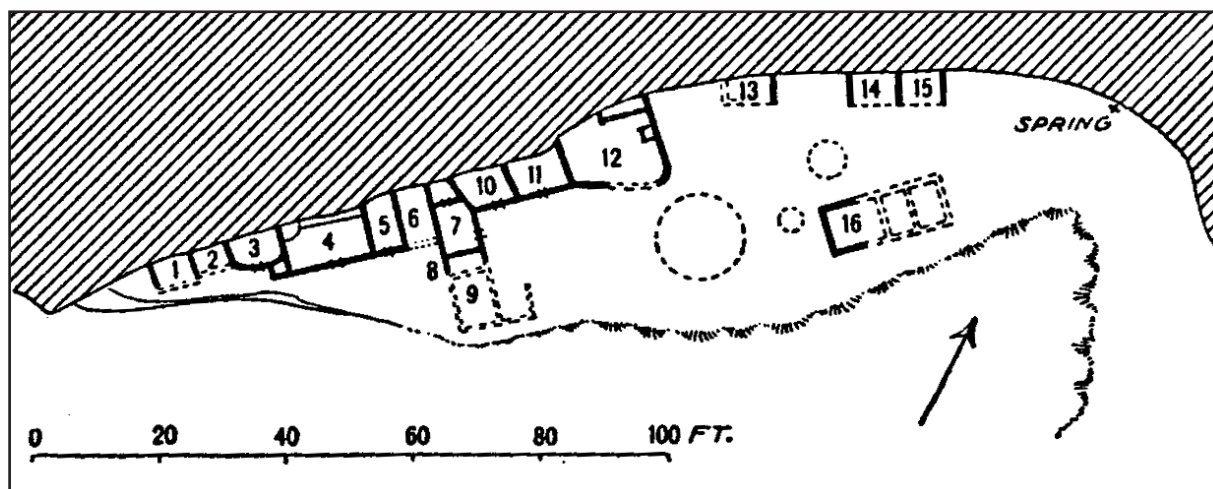


Figure 56. 42Ka1504, Cave 6 sketch map (after Judd 1926).

Of particular interest are the accretionally constructed granaries in the west end of the shelter that may represent storage architecture associated with the Pueblo I occupation (Figure 56).

Dating

The pithouse remnant and its floor features are minimal but what remains is well-defined and compares well with other Pueblo I and early Pueblo II pithouse floor features. A radiocarbon date on small diameter twigs in floor contact yielded a 2 sigma date of Cal A.D.720 -735,A.D.760-1020 with a calibrated midpoint of A.D.895 (Beta 26630).

42Ka2195 (Hildale Site) (Nielson et al. 1998)

This site lies at an elevation of about 5,000 feet, one kilometer northwest of Short Creek. The site was located on BLM lands and was excavated to facilitate a land exchange. This is a very complex site with multiple episodes of construction evident as well as superpositioning of features. Although the seven radiocarbon dates range from Basketmaker to II extending into late Pueblo II times, the basic site plan of a southeast oriented arc of cists and pithouse as well as the association of plain gray, Washington Black-on-Gray, and St. George Black-on-Gray ceramics, indicate that this is essentially a Pueblo I site with both a significant earlier component and

a terminal occupation that occurred during Early Pueblo II times. Only two corrugated sherds were found, both were on the surface of the site.

A wide range of projectile point styles representing the Basketmaker II - Early PII temporal span include: an Elko Side-notched and a stemmed point; Eastgate; Abajo; Rose Spring Corner notched, side notched and contracting stem; Parowan Basal- notched and a possible Bull Creek in questionable context (Walling-Frank 1998:10.6-10.9). In addition to the above named types a series of small, arrow points are described as: side-notched with expanding stems, contracting stems, as well as corner-notched and side-notched (Frank-Walling 1998:Table 10.9).

Dating

Two “late” radiocarbon dates (Beta 28331 and 28332) from occupation surface 2 and the Pithouse 1 hearth, suggest possible occupation “as late as the 1100’s A.D.” (Allison 1998:9.16). As regards the introduction of late Pueblo II ceramic types to the Grand Staircase, this observation is critical. It should be noted that the w2 sigma range allow both dates to be as early as circa A.D.1000 (Table 10). Unfortunately the 2 sigma ranges of these dates are not very useful in establishing a terminal date for the Early Pueblo II period. The range of dates on this relatively small site, spanning over 1,000 years of Formative prehistory, while remarkable, is not uncommon in the Virgin region.

Laboratory Number	Prov.	C14 Age	2 Sigma Range	Material
Beta 28330	F15	1480+/-70	AD 427-671 682-685	Stained Sand
Beta 28331	Occ. Suf. 2	820+/-70	AD 1035-1104 1107-1142 1148-1294	Hearth Fill
Beta 28332	PH-1, hearth	950+/-60	AD 993-1216	Stain Sand
Beta 28333	PH-3	1520+/-60	AD 425-645	Charcoal
Beta 28334	F14	1610+/-110	AD 180-193	Charcoal
Beta 28335	Roast pit	1190+/-70	AD 690-753	Char. Sand
Beta 28336	F17	1930+/-80	158-146 BC 109-100 BC 93-66 BC 64 BC-AD 259 AD 281-291 AD 298-322	Charcoal

Table 10.Radiocarbon Dates From 42Ka2195 (After Billat 1998).

**42Ws920 The Mixmaster Site
(R. Thompson feature notes)**

Mixmaster is located on Little Creek Mt and was excavated by the Southern Utah University Archeological Field School in 1988. This large, initially "C" shaped, rubble mound was fully excavated to reveal an extremely complex architectural sequence that spanned the Pueblo I through late PII periods. The ceramic assemblage indicated a thorough mixing of deposits that should serve as a caution to those attempting seriation studies on any but the simplest of Virgin sites. Of particular interest is a rebuilt "kiva" which had evidence for both an earlier slab-lined vent (cf. 42Ws1365) and a second, tunnel, vent shaft. The Pueblo I style slab-lined bench was used as a platform for the coursed masonry upper walls of the late Pueblo II rebuild. Given the complexity and length of the building sequence, the Pueblo I radiocarbon dates, found in ambiguous late PII contexts serve only to demonstrate the practice of reusing structural timbers. (See Appendix A for radiocarbon dates).

**42Ka2594
(Westfall 1985)**

This small architectural site was excavated as part of the Energy Fuels Nuclear proposal to develop a uranium tailings pond and mill on the Petrified Forest Member of the Chinle Formation. It is one of 26 prehistoric sites identified (5 tested) along a shallow tributary of Kitchen Corral Wash. Tested fairly extensively, the site is interpreted as a habitation settlement consisting of two slab-lined pit structures that may be habitation pithouses, a surface jacal structure, a series of outdoor fire hearths, and a trash midden (Westfall 1985).

A sample of burned wood collected from the lower floor fill of the F1 slab-lined structure yielded a conventional date of 1130 $\pm$ 120 B.P. (Westfall 1985:85). Calibrated to the 2 sigma range this date is A.D. 665-1175 with midpoints of A.D. 905, 920 and 950 (Beta 8422). Feature 4, an extra-mural hearth (or roasting pit) yielded a conventional date of 1100 $\pm$ 50 B.P. (Westfall 1985:85). The 2 sigma calibration

for this date is A.D. 865-1020 with a midpoint of A.D. 975 (Beta 8423). Conceivably, the two slab-lined pit structures (F1 and F3) could be residences rather than storage cists (Westfall 1985:73); F1 was about 2.5 meters in diameter, lacked floor slabs and could be a miniature pithouse habitation similar to those at 42Ws964 and the nearby (but much later) Arroyo site. F3 was not tested but was similar in size and construction. Multiple outdoor hearths and roasts were identified and a wide variety of tools were recovered including; cobble tools, hammerstones, one and two-handed manos and a grinding slab; the chipped stone assemblage indicated primary and secondary core reduction, tool manufacturing and hunting (Westfall 1985).

If, in fact, the slab-lined structures are habitations and no storage features occur, the site has significant implications for site function and subsistence - settlement patterning issues during the Pueblo I Period. The site retains excellent research potential to address these questions.

**42Ka1811 Nipple Alcove
(Steward's Site 2)**

Nipple Alcove is an east aspect shelter formed in the Navajo sandstone at the head of the Kitchen Canyon drainage (Figure 57). Elevation of the site is 5,700 feet. Its location near Nipple Lake, a wetland which drains east to the Paria River, would have provided a perennial source of water and associated riparian resources. At present the alcove holds the remains of two circular masonry structures and evidence for a third on the extreme north end. The two intact structures are very similar in size and construction to Room 1 described by Judd (1927) at Cave 1 in Cottonwood Canyon (Figure 58). Judd reported the free-standing, granary-like structure as 10 feet (3.05m.) in diameter and 5 feet 10 inches high (1.81m.). The structure had a hearth on the northeast side suggesting to Judd that it had probably served as a habitation.

Steward's description of the three structures is worth quoting in its entirety. His observation that they are transitional to the "masonry house period" (i.e. Late Pueblo II) is apt and is born out by recent radiocarbon dating.

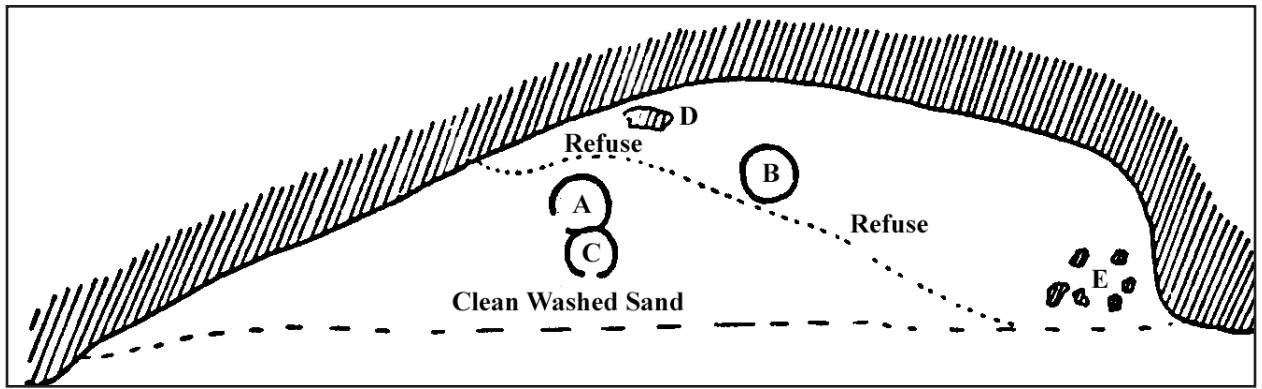


Figure 57. 42Ka1811, sketch map of Steward's Site 2 (Steward 1941).

ADOBE WALL PIT LODGES

"Site 2, a cave (Figure 32, pls. 43,44), contains three circular pit lodges. A (pls.43,a;44,a) is 10 feet 8 inches. B (pl.43,b) is 9 feet 6 inches, and C, 8 feet 6 inches in diameter. All are nearly identical in construction. A was excavated: Pit, 3 feet deep, circular, paved with sandstone flagstones; pit edge lined with 12 to 14 vertical slabs each 1 inch to 4 inches thick, 2 feet wide, 3 feet tall; floor and wall plastered with red adobe. Wall, averaging 8 1/2 inches wide, carried above pit, consists of a few horizontal stones laid in much adobe; layers or courses are 4 inches to 6 inches thick, each rounded on top; adobe in wall is reinforced with chopped grass and sticks or long fibers running horizontally; highest point now standing is 7 feet 3 inches above floor. Door: southeastern side, bottom being about ground level; sides are rounded ends of wall; width, 3 feet 7 inches, slab under door stands 2 feet 1 1/2 inches above floor. No fireplace, but fire had been in middle of floor. Unburned adobe lumps with pole impressions suggest horizontal pole-and-adobe roof.

An adjoining circular house, C, 8 feet 6 inches outside diameter, was built probably before A. Floor, 1 foot 11 inches below floor of A. Wall is similar to A, having a slab-lined base and small number of stones in much adobe above. Door, east side, was 2 feet wide, with horizontal slab sill 4 feet 6 inches above floor, or 1 foot 6 inches above slabs. Walls of C, which was not completely excavated, did not show above cave floor previous to excavation.

These houses are probably of the period of the late Paria gray and Basket Maker black-on-gray pottery, although few sherds to date them were found. A Tusayan black-on-red pitcher (Figure 41) (Figure 58, this volume) within 1 foot of the floor

of house A, together with the beginnings of masonry in the upper walls suggests influence from Tusayan, Pueblo II, not yet fully implanted locally; in short, a transition to the local masonry house period. It is by no means impossible, however, that some of the slab structures at the out-of-door sites described above had walls like these, for such walls are very perishable. Wetherill (1934) found some slab structures which had slab-lined floors and possibly crude masonry walls, in the Zion National Park region. Were the site 2 houses subject to erosion, only a ring of slabs would remain" (Steward 1941:291-292).

This latter observation on the construction of storage cists is insightful: Virgin Pueblo I cists are lined with vertical slabs, abutting or set just behind flagstone paved floors, as a means of rodent proofing - just as they were during BMIII times. By Pueblo I, the addition of low masonry upper walls, set just behind the tops of the slabs, surrounded the subterranean slab-lined pit (see Road Kill, 42Ka4859). As Steward speculated, the upper walls of exposed cists did collapse, numerous examples of this type of feature are known on the Grand Staircase and in the St. George Basin. A good example is 42Ws200, Parunuweap Knoll, (Aikens 1965) (see Figure 117). If these exposed cists also used large quantities of perishable adobe their wall height and volume could be seriously underestimated.

Steward took the red ware pitcher in the fill of house A to be an indication of a Kayentan Pueblo II influence. A similar vessel was found on the surface of 42Ka3973 in the Kitchen Corral drainage (Figure 59). That vessel appears to be an early style of Tsegi Orange Ware, probably Medicine Black-on-Red.

Dating

In concert with a stabilization program carried out by the Mesa Verde stabilization crew (Fiero (2001), three radiocarbon dates were obtained from organic material in Nipple Alcove. Two assays were from rabbitbrush, bound in the matrix of adobe described by Steward. Probably cut live, these twigs provide the ideal context and material to date adobe structures. A third assay was obtained from a corn cob collected from the surface that would provide an estimate of when agriculture actually took place.

An assay of twigs in adobe rubble on the extreme north (Steward didn't describe this feature) yielded a date of A.D. 655 to 875 (2 sigma) with a calibrated midpoint of A.D. 705 (Beta-109805). Similar material, associated with Stewards structure B, yielded a date of A.D. 790 to 990 (2 Sigma) with a calibrated midpoint of A.D. 890. A 12 row corn cob from the surface of the site dated A.D. 885 to 1035 with a calibrated midpoint of A.D. 995. All three dates are consistent with the architecture and plain gray ceramics found on site.

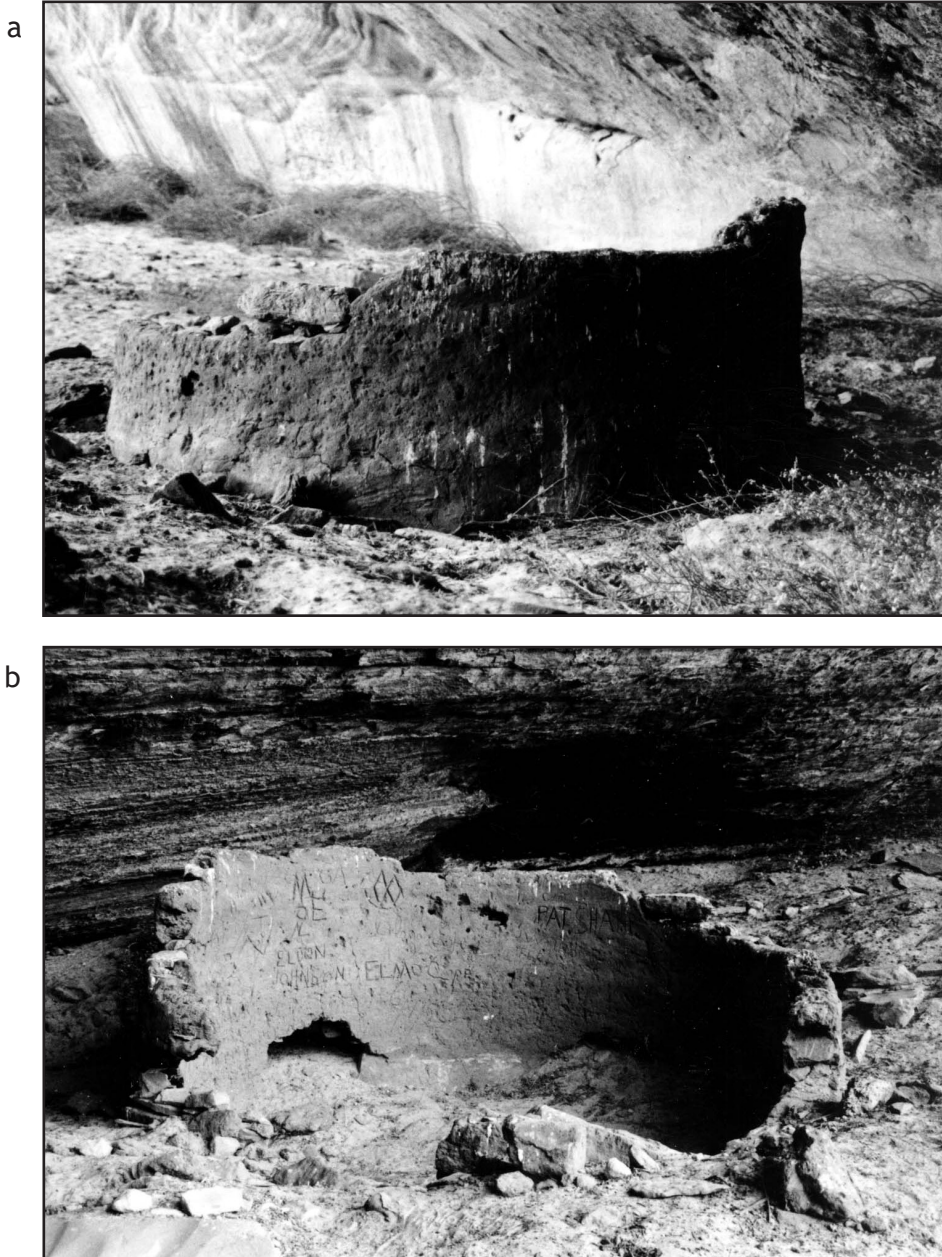


Figure 58. Circular storage rooms: (a) 42Ka5058 Cave 1, Room 1(Judd 1926); (b) 42Ka1811, Room B (Steward 1941) (author's photos).

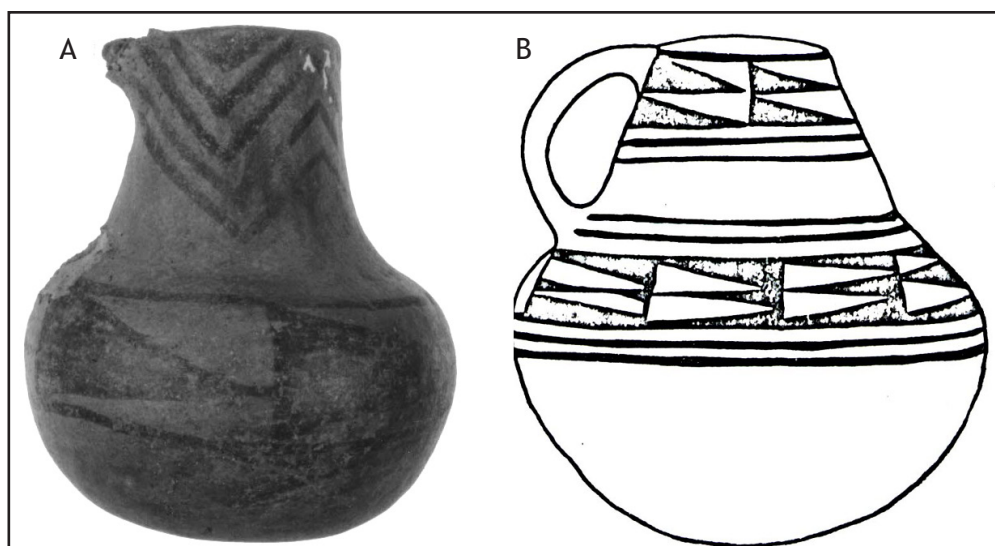


Figure 59. (A) Medicine Black-on-red pitcher from 42KA3973, height 4 $\frac{3}{4}$ inches. (B) "Tusayan Black-on-red" pitcher, collected by Steward from Site 2, Molly's Nipple Canyon, height 5 $\frac{1}{2}$ inches. (After Steward 1941).

Site Function

Although Steward called these large circular structures "lodges" and Judd noted a hearth in the Cave1 "room", their use as a domicile was probably temporary. Assuming the three structures are in fact storage units, the volumes are very high for annual requirement of a single family (see Table 28). Multiyear storage is one possibility for their large size but more likely the structures could have served multiple families or perhaps a single extended family unit.

The emerging pattern during Pueblo I times of isolated single use storage sites suggests that these structures served as high volume storage units at some distance from residential sites. Nipple Alcove's location near the wetlands of Nipple Lake may reflect an alternate settlement strategy that was adapted to the drier conditions that prevailed during Pueblo I times (Plog 1988).

42Ka5058 (Judd's Cave 1)

Also called Riggs Cave by Judd, this large, well protected, east aspect alcove has a level floor with deep sand fill and measures 45 meters by about 12 meters deep (Figure 60). Its setting is in a well-watered, arable reach of Cottonwood Canyon. Judd recognized two occupations: a "pre-Cliff-dweller" occupancy, which he considered "Basket Maker", defined by slab-lined cists; and a later occupation he called "near cliff dwellers" represented by a large

circular masonry structures identified as Rooms 1 and 2 (Judd 1926).

In addition to the two architectural forms present on site, Judd noted "Characteristic Basket Maker paintings" (see Judd, 1926: Plate 60). In fact, two rock art styles occur at the site; the amorphous "doughboy" human form associated with Basketmaker II sites (Figure 16) and the very formal, polychrome pigmented, Cave Valley style anthropomorphs (Figure 33). The two occupations at Cave 1 identified by Judd suggest that the Cave Valley style figures were the work of the latest occupation.

Based on the similarity of construction between the slab-lined cists, which he described as nearly identical but smaller than those at Cave du Pont, and two larger, apparently later structures, Judd believed that both Rooms 1 and 2 had been "reconditioned" by the later occupants. Room 1 was described as lined with sandstone slabs that stood some 2 feet high forming the inner wall. The free-standing, granary-like structure was 10 feet (3.05m.) in diameter and 5 feet 10 inches high (1.81m.). Above and behind the slabs is a composite wall of adobe masses reinforced by sage or rabbit brush twigs.

The size, form, and construction of Room 1 is nearly identical to Steward's (1941) "pit lodges" at 42Ka1811 (Figure 58). A notable difference between the two sites is the presence of a clay coped hearth on the clay floor surface just inside the doorway of Room 1 and a possibly reworked entry

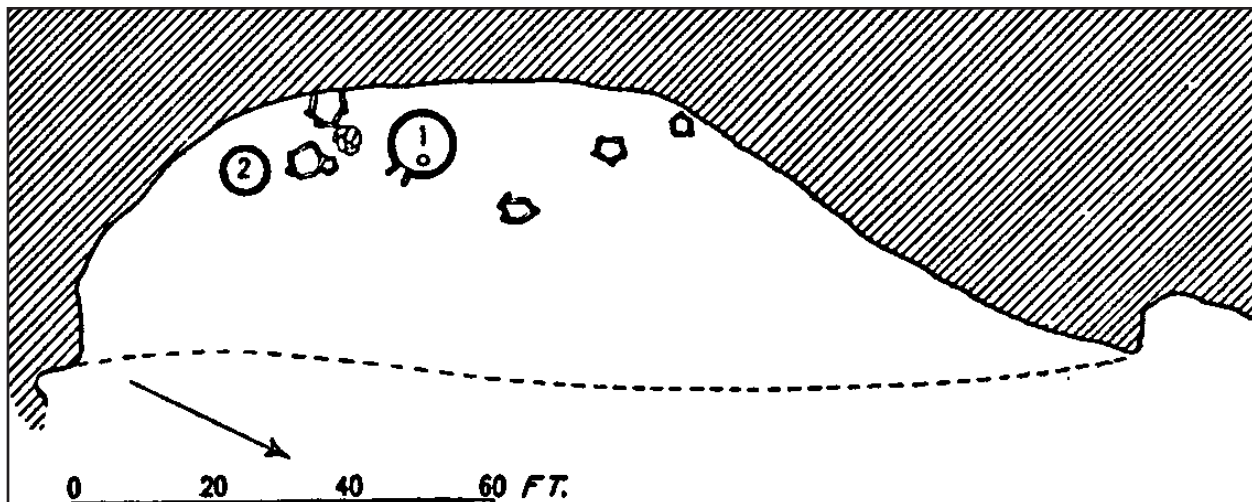


Figure 60. 42Ka5058, Cave 1 sketch map (after Judd 1926).

(Judd 1926:93). Judd noted that, in addition to plain gray pottery in the upper deposits, that corrugated and black-on-white sherds were present in the cave.

Judd (1926:Plate 55) pictures “agricultural implements” consisting of seven apparent digging sticks and a cache of corn with kernels that originated at the back of shelter (Plate 59). Most of the cobs appear to be the typical 12-14 row variety, some are dented. Presumably they are still in the Smithsonian Institute collections. From elsewhere in the shelter he describes “a bag of mountain goat hair.” Although no trace of it exists today, the surface of the site was covered with cedar bark and corn stalks some 4 feet thick – similar to that encountered by Nusbaum (1922) at Cave du Pont. The presence of corn stalks suggests fields were nearby and that maize was processed and stored in the alcove. Judd encountered no sherds in the lower level. He did note “scattered ribs and skull fragments” that he believed were the remains of a Basketmaker burial that had been disturbed by the second occupation (c.f. 42Ka1168, 42Ka3575, 42Ka3576).

Twigs collected from the adobe matrix of Room 1 yielded a date of Cal A.D.655 - 965 with an intercept date of Cal A.D.770 (Beta-140951). This date is coeval with the dates on adobe matrix twigs from Nipple Alcove which held nearly identical structures. The volume of Room 1 is over 13 cubic meters making it one of the largest granaries on the Grand Staircase (Table 28).

Judd mentions a similar structure he called Cave Ruin located in a tributary to Kanab Canyon called Riggs or Chokecherry Canyon, just below Crocodile Spring. Described as between 5 and 6

feet high, pictured as slightly sub-circular (Judd 1926:49), it was constructed of rough masonry, slab uprights around the base of the interior, and topped with masses of adobe mud reinforced with rabbitbrush. The structure was plastered inside and out and had no apparent entryway (Judd 1926:49).

The distribution of silo-like granaries seem to span the Grand Staircase physiographic section. An alcove site (42Ka1802) with similar a structure occurs in the Hackberry Canyon drainage on the extreme eastern edge of the Grand Staircase. Minimally recorded in 1977, it was located on State of Utah administered lands until establishment of the GSENM. There was evidence for seven original structures; only about fifty percent of a single granary remained in 1977. The structure was 6 feet high, 8 feet in diameter, and roughly circular with an elevated entryway. Both plain gray and corrugated ceramics suggest the site had multiple occupations.

42Ka2031 Neaf Spring Alcove

This shelter is believed to be Julian Stewards Site 91 which he briefly describes as “Cave opposite Neaf Springs previously dug. Sherds, muller, and corn cob found” (Steward 1941). Located in a large, well formed, southeast aspect alcove at an elevation of 6,200 feet, the site displays a minor green pictograph and evidence of small-scale adobe architecture possibly similar to that at Nipple Alcove (42Ka1811). Plain gray ceramics and some late Pueblo II style sherds, a few lithics, and corn cobs make up the artifact assemblage. A corn cob

found on the surface of the site was radiocarbon dated Cal A.D. 665 to 985 (Beta-125910) with an intercept date of cal. A.D. 800. The Pueblo I age of the cob and its occurrence in a limited activity shelter near perennial water sources may reflect an alternate logistical strategy to deal with the drier than normal climate during that period (see also 42Ka1811).

42Ka7151 Deer Creek Shelter #2 (M. Zweifel)

This large, west aspect shelter is located along Deer Creek, a perennial tributary to the Paria River. It contains the remnants of two or three granaries constructed of stone and mud originally occupying an area 6-7 meters long and 2.5 meters high as evidenced by mud outlines on the back wall of the shelter. Width of the structures could not be determined but overall size suggests large volume storage capability. A dressed sandstone slab suggests a granary sized entry closure. The lack of artifacts on site indicate the shelter was not used as a habitation. Typical of Pueblo I construction, numerous twigs (apparently rabbit brush) were added to the adobe as a binder. A radiocarbon assay on this material was dated Cal A.D. 680 to 830; Cal A.D. 840 to 870 with intercepts of A.D. 730, 740, and 770 (Beta-317153). This date appears to be slightly later than the date on maize at nearby 42Ka1499 (see BMIII section).

Large volume storage capacity and a few corn cobs suggest that Deer Creek Shelter #2 served as an agricultural outpost. Its location along a perennial stream along with additional agricultural potential at the confluence with the Paria River would have provided multiple options for field locations. Single function storage sites, often located near perennially watered settings are common during Pueblo I times.

42Ka1694 Lost and Found Alcove

This site consists of an intact granary, the remnants of two masonry rooms, up to a dozen small bell-shaped pits dug into the bedrock, and apparently a deep bedrock cist (Figure 61). It was minimally recorded in 1969 and plotted on the

Kanab 15 feet quadrangle map as “approximate.” The site form was updated in 1984. In 2014 it was relocated, the site form was updated, and several tree-ring samples collected for dating (see Appendix B).

The southwest aspect alcove is deep and well protected from the elements. Situated on the rim of the Block Mesas at about 6,000 feet it is located close to a substantial Pueblo I and Early Pueblo II upland occupation (see Figure 6). Located in a similar setting as nearby 42Ka1520 and 42Ka 5579, all three sites shelter granaries and/or storage cists and suggest a logistical strategy was employed, at least at times, during the Pueblo I and early Pueblo II periods.

The best preserved feature on site is an intact granary with a roof consisting of 5 or 6 four inch diameter beams overlaid with 1/2” thick twigs covered by juniper bark and sealed with 4” of adobe (Figure 62). Masonry is fairly well laid 12 feet x 4 inches tabular rock with a well plastered interior measuring 230cm wide and 180cm deep. Two additional wall remnants occur on the southeast end along with several timbers leaning against the wall. (see 42Ka1520 for a similar situation). Towards the front of the shelter a curving exposure of plastered slick rock was observed in 1984. Loose sand concealed the feature which was suggestive of a large subterranean pit. Partially concealing the pit was a mound of sand with adobe fragments, corn cobs and ceramics. Other artifacts, including two milling slabs and a hammerstone, suggest domestic activities occurred on site. A photo from the Kanab Field Office files taken in 1979 show a bedrock cist with masonry collar labeled 42Ka1694 (Figure 63).

An attempt to tree-ring date two 4” diameter juniper samples, submitted in 1984, was not successful (Appendix B). A pile of approximately 150 grayware sherds were collected at that time which included; 2 Boulder gray, 3 or 4 North Creek Gray sherds with slightly everted PI and early PII style rims, and a single St George Black-on-Gray sherd. The ceramic collection appears to be consistent with the architecture which suggests, at minimum, use of the site during Pueblo I and Early Pueblo II times. The site retains excellent tree-ring and radiocarbon dating potential.



Figure 61. 42Ka1694, (Right) general view of granary. Note small bedrock pits. Evidence for a large subterranean pit was visible in 1984 in front of the granary (see Figure 63). Abutting, curvilinear storeroom walls on east (left).



Figure 62. 42Ka1694, granary ceiling.



Figure 63. 42 Ka1694, bed rock cist with masonry collar; (1970 photo, Kanab Field Office files).

42Ka5609 S P Alcove

This is a deep, west aspect alcove in Cottonwood Canyon, on the eastern margin of the Grand Staircase, offering excellent protection from the elements. Although the deposits have been disturbed, they are apparently deep and in many places sealed with large roof spalls. There are no obvious indications the site has been intensively used i.e. structural remnants and rubble. Artifacts on the surface include; both portable and bedrock milling stones, a hammerstone, quartzite cobbles,

lithics, and polished cobbles. Organic material includes grass chafe -some entire plants, juniper bark, and abundant charcoal - possibly a result of historic use.

A distinctive anthropomorph pictograph in red occurs on the back wall. Similar figures are known to occur west of Kanab Creek (Figure 45). A corn cob collected from the surface yielded a 2 sigma calibrated radiocarbon date of A.D. 770-1040 (Beta-150670) with midpoint of A.D. 970. The date is consistent with the single Pueblo I style, plain gray rim sherd collected.

EARLY PUEBLO II SITE DESCRIPTIONS

42Ka5628 Park Wash Shelter

This east aspect shelter displays minimal evidence of architecture and artifacts but potentially was occupied during the Late Archaic based on pictographs vaguely reminiscent of Barrier Canyon style. Charcoal flecked deposits suggest the possibility of intact deposits. Evidence for puebloan occupation includes a single plain gray sherd, a nearly troughed metate and structural adobe (with datable twigs and bark as a binder) and irregular rock indicates a probable storage structure. A radiocarbon date on a 12 row corn cob yielded a calibrated date of A.D. 970-1230 (Beta 150669). The date is imprecise, as those of this time range are prone to be, however the midpoint (A.D. 1030) and the conventional age as well (A.D. 960 +/- 70), may actually reflect an Early PII occupation. A single Cave Valley style rockart figure supports the date. Early Pueblo II is not well represented in the Kitchen Corral drainage.

The date on a grass plant, pulled from its roots and found in a disturbed deposit along with juniper bark, dated A.D. 1400-1530, 1550-1630 (Beta-150668) with a midpoint of A.D. 1440, was a surprise and evidently documents an unrecognized Southern Paiute occupation. Westfall (1985) also reported a post Formative C14 date from the Kitchen Corral drainage (Table 25). This area below the Vermilion Cliffs is known to have been used by the Kaibab Paiute during the winter and spring (Kelly 1971).

42Ka1520 Bay Bill Granaries

Primarily a storage site, these granaries are located in a tributary to Parunuweap Canyon which heads on Harris Mt. Three storage features were recorded in two small rockshelters formed in Navajo Sandstone at an elevation of about 5,900 feet. Structure 1 is located in a west aspect alcove. It is a large "D" shaped masonry granary measuring

2m x 1.4m with an interior height of 1.5m. It has a rectangular entry with a sandstone slab lintel and threshold. A worked riparian twig collected from the structures interior fill yielded a radiocarbon date at 2 sigma of A.D. 980-1235 (Beta-134476). While the calibrated midpoint of A.D. 1040 is one of the latest early Pueblo II dates available, precision of the date is poor. A single sherd of St. George Black on Gray and a few non-diagnostic North Creek sherds were observed. Just behind Structure 1 is a second, smaller granary of similar construction wedged into a crevice (Figure 64).

Thirty meters west is a separate south aspect alcove which holds a circular storage cist excavated into Navajo sandstone bedrock. Encircling it is a fine masonry wall plastered on the interior; diameter is 1 meter with an undetermined depth of over 70 cm. Evidence for a second structure occurs deeper in the alcove. Although no ceramics or diagnostics occur on this portion of the site, the cist architecture appears to be Pueblo I.

Two agricultural opportunities occur in the vicinity of the Bay Bill Granaries. The most dependable is the East Fork of the Virgin River which is over 4 kilometers to the north. A second possibly is dryfarming on the mesa top itself. The high site density of Pueblo I and early Pueblo II sites in the vicinity indicates that dryfarming at elevations over 6,000 feet was common during the early puebloan periods (Figure 5). A small residential/storage site occurs on the mesa top just above the site and may be associated with the granaries.

Note: This site was stabilized by the Mesa Verde stabilization crew (Fiero 2001). At that time nine tree-ring dates, strongly clustered around A.D. 1150, were obtained from the site (see Late PII site descriptions). Architectural cross-dating, the radiocarbon date, and tree-ring dates suggest activity on site during the Pueblo I, Early Pueblo II, and Late Pueblo II periods.



Figure 64. 42Ka1520, granaries (Kanab file photo circa 1970).

42Ka1969 The Kanab Site (Nickens and Kvamme 1981)

This small residential site is located along Kanab Creek just north of the Arizona border at an elevation of 4,800 feet. Relatively thorough excavations revealed a five meter diameter benched pithouse with slab-lined interior pit, a recess on the southeast and five subfloor bins aligned against the back wall (Figure 65 and 66).

To the northwest of the pithouse are three slab-lined features described as both storage cists and four slab pavements termed "work patios." The cists are contiguous shallow rectangular features probably with some form of perishable superstructure - likely jacal. The patios were not bordered by upright slabs and exhibited no evidence of superstructure. It seems possible that these features were initially the floors of storage rooms that were abandoned and perhaps remodeled.

Architectural features and the midden deposits produced a large and varied artifact assemblage. Fourteen projectile points were recovered. The predominant style is a deeply corner-notched triangular point with a straight stem and slightly concave blade margins. Other artifacts include: one and two handed manos, trough and slab metates, hammerstones, choppers, bifacial blades and knives, drills and a hoe.

Ceramics recovered totaled over 11,000 sherds and were overwhelmingly Virgin Series, North Creek Gray (85%) and St George Black-on-Gray (12%). Only 3% were classified as Shinarump Gray - a type that is predominate during early Pueblo II times on the eastern portion of the Grand Staircase.

Evidence for external relationships and trade include fifteen sherds of Bluff Black-on-Red (identified by David Breternitz) and quantities of *Glycymeris* sp. and *Olivella* sp. shell beads very likely passed along from the western margins of the Virgin region.

Subsistence at the Kanab site was varied with evidence for both native and domesticated species. Turkey remains, both bone and egg shell, dog, and artiodactyls - antelope, deer and bighorn sheep are represented. Charred maize kernels were encountered and corn pollen was present in most of the samples analyzed. As is typical in the region the dog remains were articulated and apparently were not a food source.

No dendrochronological specimens were obtained from the site and a total of 6 radiocarbons samples were collected. Two dates were obtained for the early Pueblo II component: an open hearth yielded a conventional date of 990+/-110 B.P. (RL-1396) tree-ring calibrated date (2 sigma) to A.D.855-1270 with a midpoint of A.D.1025. The pithouse hearth yielded a conventional date

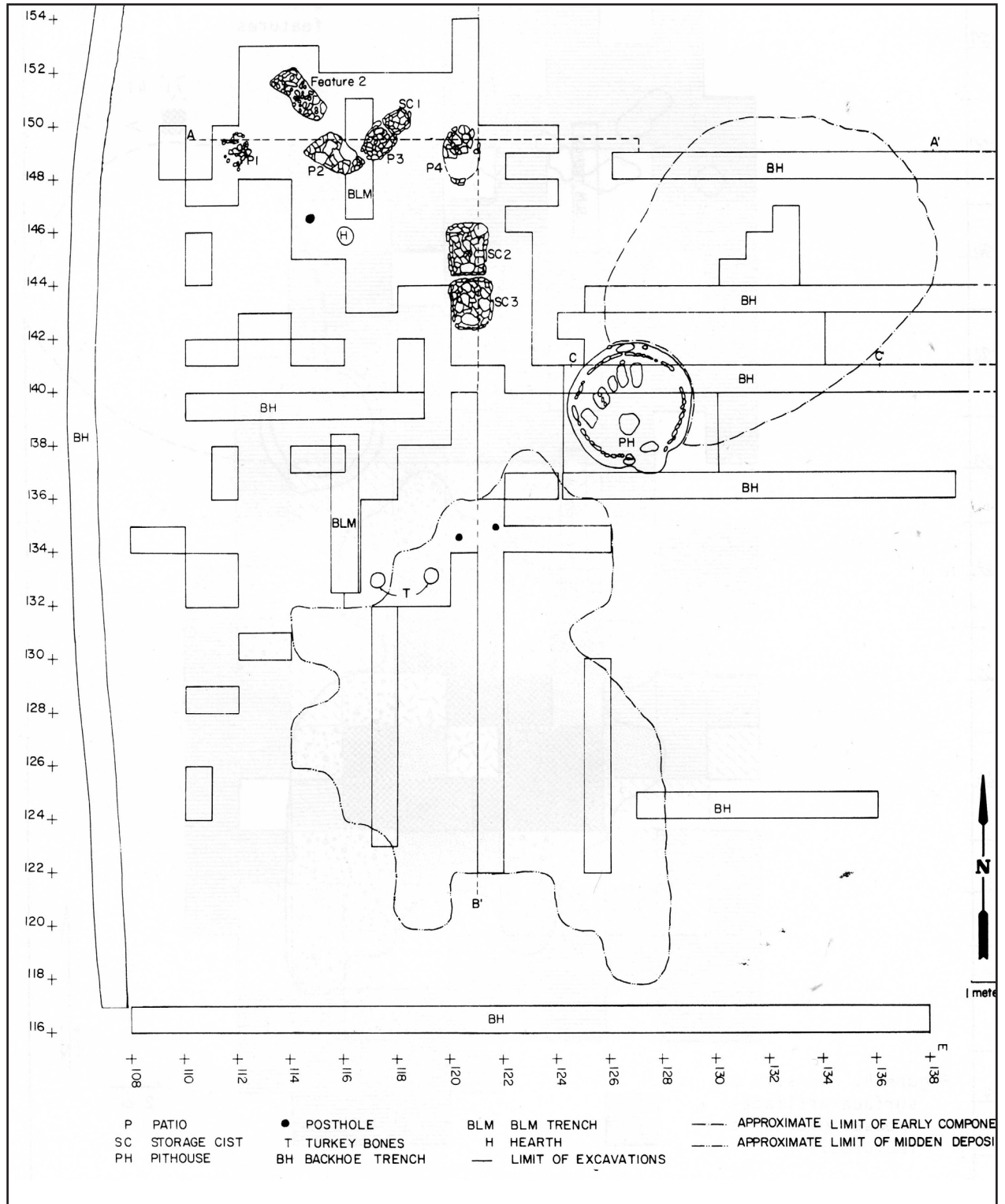


Figure 65. 42Ka1969, plan map (Nickens and Kvamme 1981).

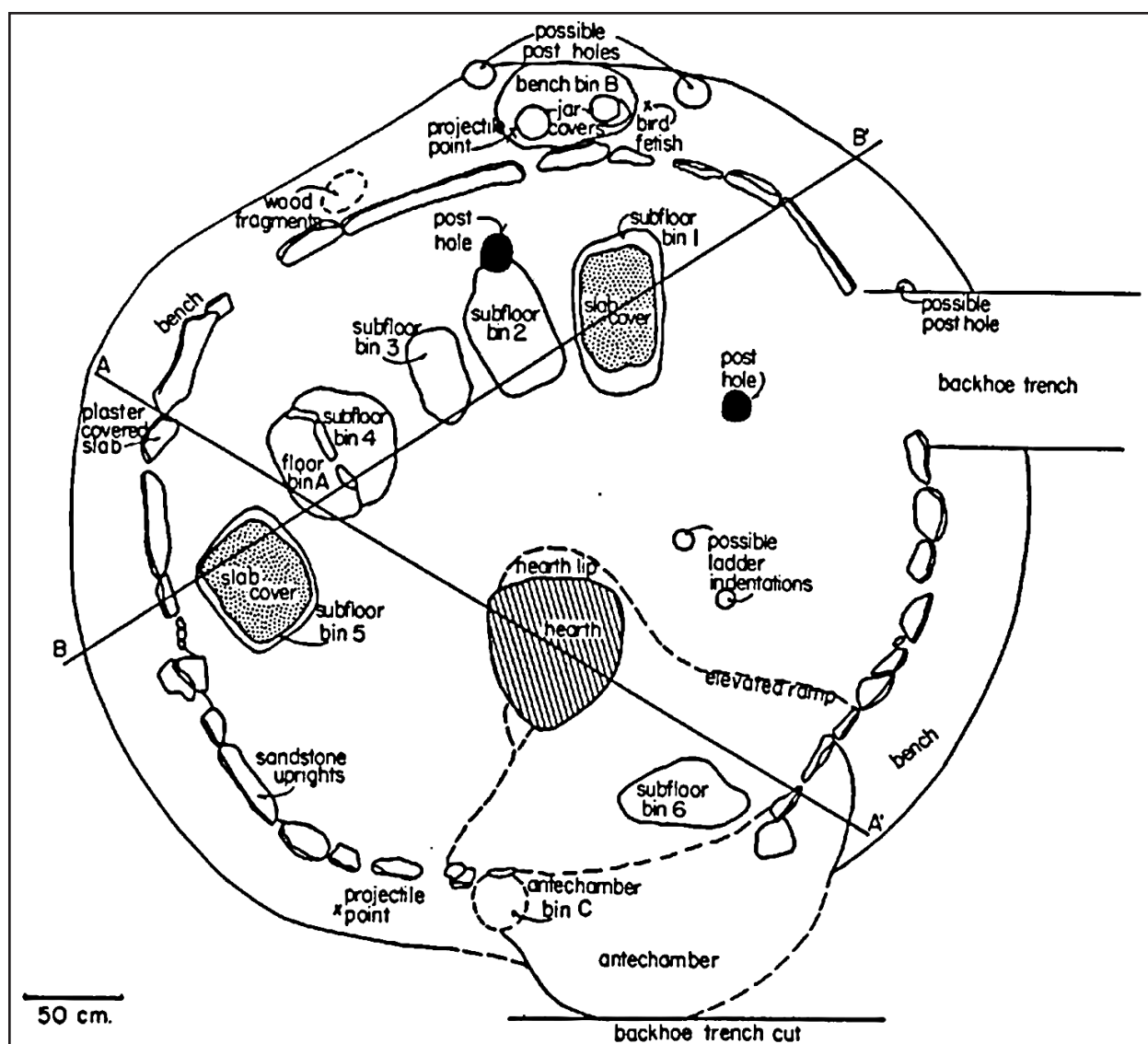


Figure 66. 42Ka1969, pihouse plan (after Nickens and Kvamme 1981).

of 810 $\pm$ 110 (RL-1397) and a calibrated range of A.D. 1010-1400.

The Kanab site represents a household-sized residential unit occupied towards the end of the Early Pueblo II period. Pithouse architecture has strong affinities with other early Puebloan sites in both the St. George Basin and on the Grand Staircase. While the number of storage rooms indicate a reliance on agriculture, the sizable and

varied collection of faunal remains indicates that locally available game was an important supplement to agriculture.

Two additional radiocarbon dates were run in 2001 in an attempt to refine the terminal date for the Early Pueblo II period. Instead of relying on potentially "old wood" charcoal, bone from the midden deposit was obtained from the Southern Utah Archaeological Repository (Table 11).

Lab. #	Provenience	Material	C14 age (BP)	2 sigma (Cal)	Cal. intercept
Beta-157844	Accession #1602-12; N32, E118, 0-20cm	Turkey bone	1170 $\pm$ 40	AD 770-980	AD 880
Beta-157845	Accession #1603-64; Midden unit #5, 20-40cm	Unidentified artiodactyla	1220 $\pm$ 40	AD 690-900	AD 790

Table 11. Post-excavation dates from 42Ka1969 midden.

Rather than refine the terminal date for Early Pueblo II these two relatively precise dates from the midden illustrate that the Kanab site was being intensively used during Pueblo I times. The date on turkey bone comments on its probable domestication during Pueblo I times. The dates also provide some temporal control for the midden deposit itself. The deposits were relatively rich, particularly in faunal bone, and remain to be analyzed.

A review of plain gray rims illustrated in the report, initially only suggestive of Pueblo I, reinforce the dates. The cist and “patio” features at least allow for the possibility of both Pueblo I and Early Pueblo II storage architecture on site. That the occupation was continuous seems unlikely, but these new dates reinforce the long-term, multi-component nature of early Puebloan occupation along Kanab Creek.

42Ka2667 The Dead Raven Site (Thompson and Walling 1988/2004)

The Dead Raven site was bisected by the Johnson Canyon road and was partially excavated prior to a paving project (Figure 67). Two pithouses (Figure 6) were excavated on the east side of the road and portions of a roomblock were dug on the west. Although the pithouses are considered roughly contemporary, their actual association is not demonstrated; it appears likely that Pithouse 1 is associated with the excavated roomblock while Pithouse 2 may actually be associated with an unexcavated roomblock to the north. Regardless of problematic contexts, the Dead Raven ceramic, architectural, artifactual and subsistence data represent a valuable addition to our knowledge of early Puebloan occupation in Johnson Canyon. The remaining features hold considerable potential for future investigations.

Dead Raven lies on the west side of Johnson Wash at an elevation of 5,720 feet. It is one of a cluster of early puebloan sites that concentrate in the upper reaches of the drainage just below its confluence with Skutumpah Canyon.

Pithouse architecture at Dead Raven is similar to that downstream at the Bonanza Dune site: both structures are benched with slabs lining their interior pits, probable jacal outer walls, clay-coped hearths and particularly notable, the presence of sand-filled basins on their floors. The vent configuration for Pithouse 1 was destroyed by an early looting

episode; the Pithouse 2 ventshaft was partially lined with slabs and extended to the southeast at least 1.5 meters (Figure 68).

Excavated remnants of the roomblock on the opposite side of the road from the pithouses included several intact cists, an extramural hearth, and partial remains of a sheltered “work room” (Figure 67). The cist alignment construction history involved construction of two large cists (1 and 3) followed by filling the gap between them with Cist 2 and at some point in time 2 or 3 small cists were appended to Cist 1. Overall storage volume and individual cist size appears to be typical for a nuclear family sized household during the early Puebloan period (Table 28).

Of interest in terms of site layout and room function is the positioning and construction of the workroom abutting the cist alignment (see Road Kill, Figure 49 for a similar configuration). Presence of a hearth suggests the room functioned as a residence in addition to other domestic activities; assuming the associated pithouse was the primary residence during cold weather, the room would have served well as a summer residence.

The Dead Raven report discusses a large and varied assemblage of chipped stone, ground stone, shell, and bone artifacts. The projectile point collection, all small and basically stemmed, were identified as Abajo (5), Rose Spring Corner-Notched (1), and Parowan Basal-Notched (1) styles.

Thompson offered a good discussion of Shinarump series ceramics including their definition and distribution. Out of a total of about 5,700 sherds, Shinarump grayware accounted for 53%, while 46% were classified as North Creek gray. None of the sherds were corrugated. Thompson provides illustrations of a large number of early Pueblo II everted jar rim styles and also black-on-white designs (Thompson 1988:56-59). The painted designs generally fall within the range of variation for St. George Black-on-Gray. Of interest, only one painted sherd was classified as Shinarump; during the succeeding Late Pueblo II period, Shinarump Whiteware becomes much more common.

Kathleen Heath recovered a variety of both wild and domesticated species in the macrobotanical analysis (Appendix C). All seven field specimen samples were dominated by the common bean *Phaseolous vulgaris*. *Zea mays* cob fragments were abundant in hearth and floor contexts followed by *Chenopodium* sp. in the midden.

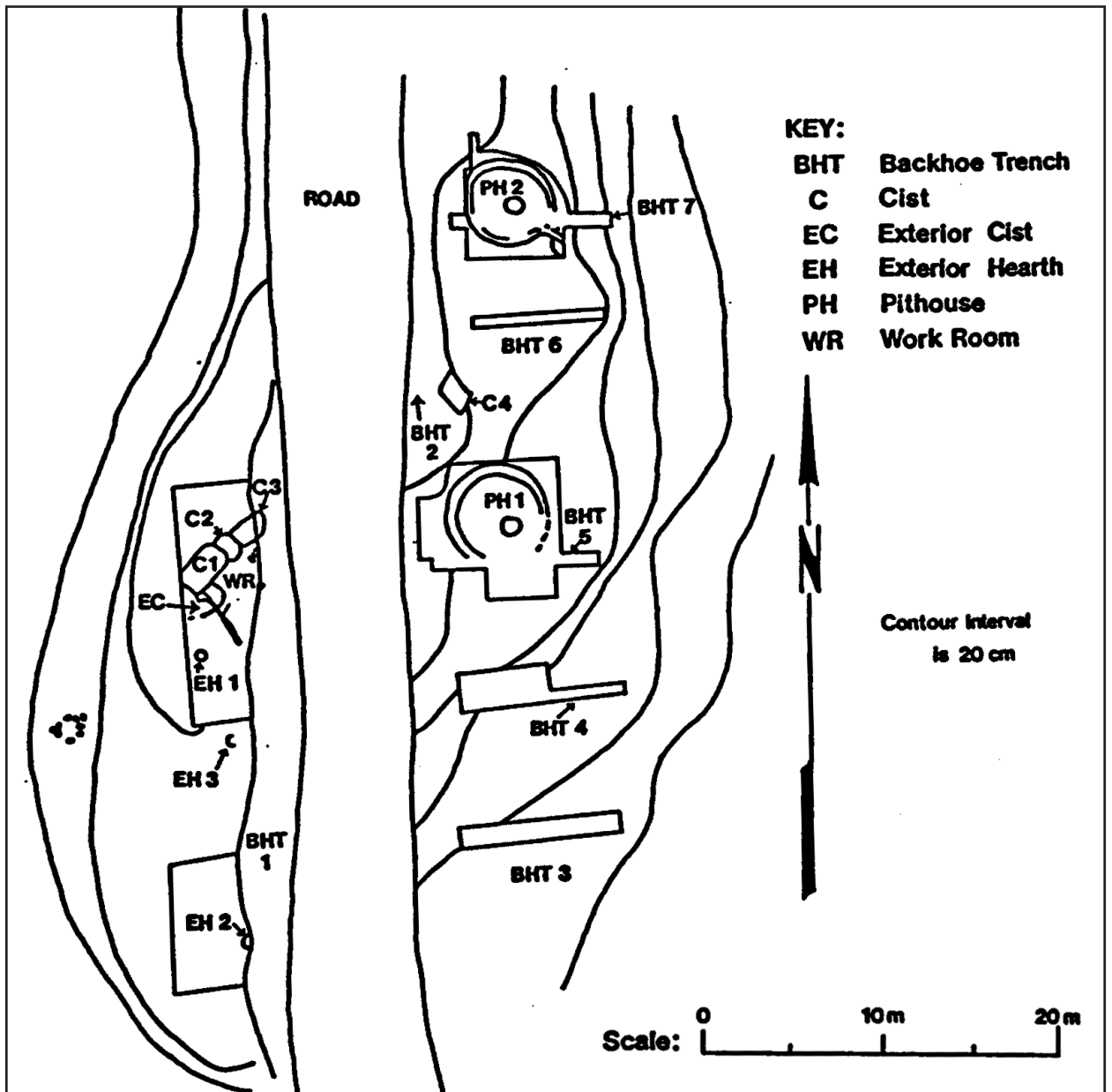


Figure 67. 42Ka2667 plan map (after Walling and Thompson 2004).

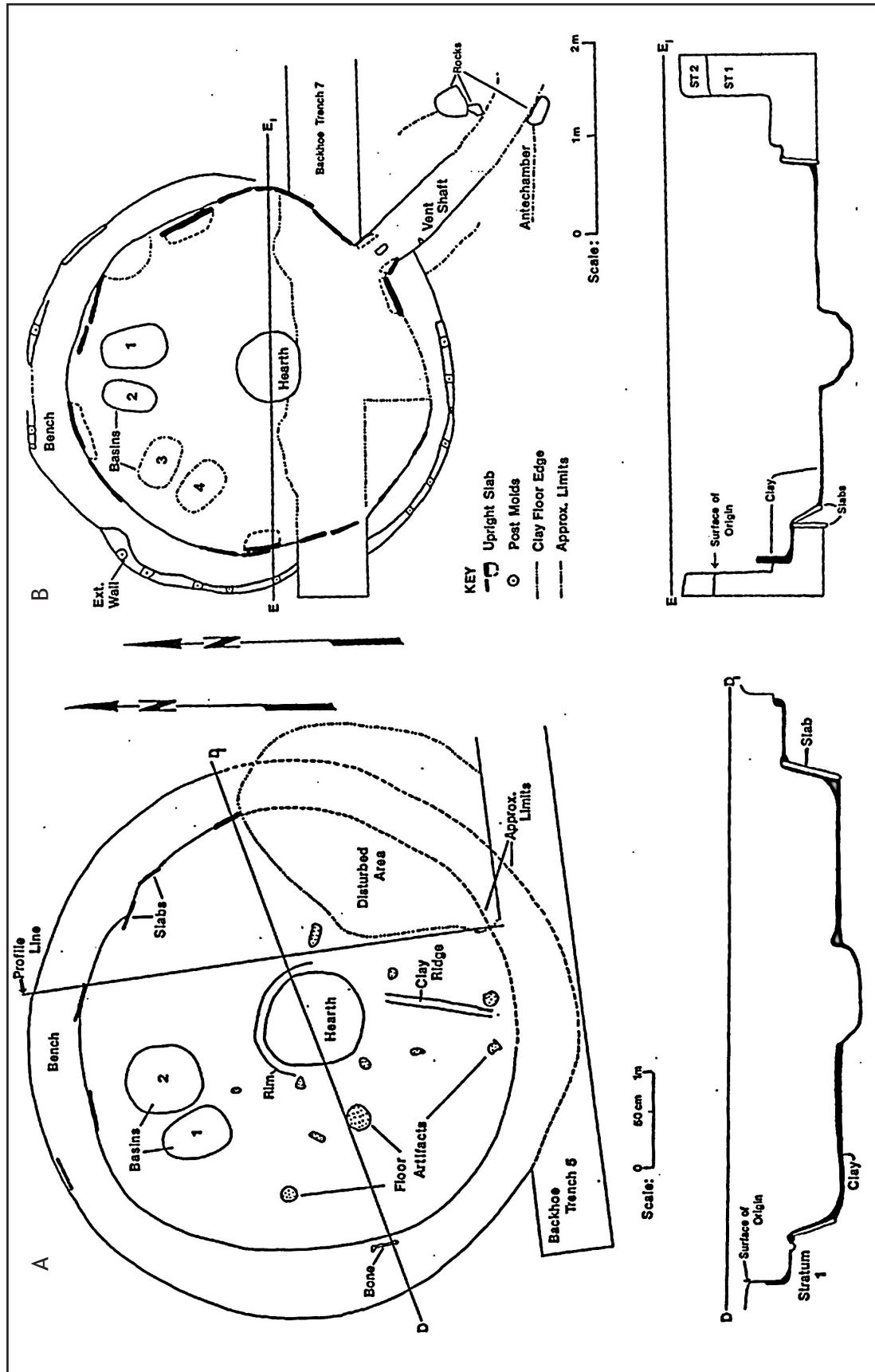


Figure 68. 42Ka2667: (A) Pithouse 1, (B) Pithouse 2 (after Walling and Thompson 2004).

Dating

Two dates were obtained from the Dead Raven site, both were from Pithouse 1. A conventional age of 1120+/-70 B.P. was obtained from charcoal on the floor; the 2 sigma range is A.D. 775-1030 with a midpoint of A.D. 960 (Beta 23054). Charcoal from the hearth yielded a date of 1010+/-60 B.P. with a range of cal A.D. 905-920, A.D. 950-1175 with an intercept of A.D. 1020.

42Ka1060 The Sand Hill Site (Aikens 1965)

C. Melvin Aikens tested the Sand Hill site during the 1962/63 field season to enhance the limited archeological sample of the Virgin region and also to provide comparative data for the Glen Canyon Project. The Sand Hill site is located in the upper reaches of Johnson Canyon on an extensive south aspect sand dune measuring 200x400 yards. The site consisted of a cluster of five separate artifact concentrations. Exploratory trenches opened at each eventually defined 12 semi-subterranean structures in three of the areas. Of the 12 structures the function of 10 were determined to be storage and 2 were unknown. No dwellings were encountered, although this is not surprising given the limited extent of the trenching program. Most of the structures were shallow, rectangular, slab-lined and slab-floored storerooms. Five of them formed a slightly curving east-west alignment of noncontiguous rooms in Area 3. The remnants of an additional five structures were uncovered south of the roomblock. By present site definition standards, two or more separate sites appear to be represented by these clusters.

Aikens describes the ceramic complex at the Sand Hills site as "uniformly late Developmental Pueblo, dating the site between A.D. 900 and 1200" (Aikens 1965:47). Knowledge gained since Aikens' work can significantly improve on the temporal classification of the Sand Hill ceramic assemblage: Excluding whitewares (55), redwares (1) and Tsegi Orangeware (1) from consideration; 3,556 sherds on site were plain gray while only 69 were corrugated. Of the plain ceramics roughly half were Shinarump and half were Tusayan Gray Ware Virgin Series (Aikens 1965:45). Clearly, the plain sherds indicate a pre A.D.1050, early Puebloan, occupation. If rim sherds were to be analyzed, it

is likely that Basketmaker III, Pueblo I, and early Pueblo II forms might be identified. Further, all but one of the North Creek Corrugated sherds and all 15 of the Shinarump corrugated were from Area 5 suggesting that, although the architecture of the single storeroom there was identical to that in Area 3, Area 5 was a post A.D. 1050/1100 occupation.

With regard to the occupational history of the Sand Hills site Aikens notes; "in view of the shallowness of the culture-bearing deposits, however, and the uniformly late Developmental Pueblo pottery complex on the site as a whole, it seems likely that the structures were all approximately contemporaneous" (Aikens 1965:42). Given recent insights into the patterns of occupation on such sites, the assumption that the Sand Hills clusters represents a large contemporaneous occupation is not warranted. Similar extensive early Puebloan sites have been documented in Johnson Canyon that could test Aikens' suggestion of population aggregation. An excellent example for an alternative to site aggregation - sequential occupation, occurs downstream at the stratified Bonanza Dune site.

42Ka1076 Bonanza Dune (Aikens 1965)

Bonanza Dune was excavated by Aikens (University of Utah) during the 1962-1963 field seasons. The site is located in Johnson Canyon at an elevation of about 5,500 feet. As Aikens observed, while the floor of Johnson Canyon has an arroyo, its tributaries are not gullied (Aikens 1965:9). In part, this is due to the extremely low gradient of the canyons alluvial floor. Sediments exposed in the arroyo along this portion of the canyon consist of fine silts and clays that may indicate long-term stability for the hydrological regime that is rare on the Grand Staircase Physiographic Section. Reconnaissance level inventory in Johnson Canyon indicates that an apparently unbroken sequence of occupation, Basketmaker II through Late Pueblo II, is represented - possibly to take advantage of this uniquely stable setting.

Bonanza Dune is a steep-faced aeolian feature abutting a rock outcrop whose sands now extend into the recently cut arroyo of Johnson Wash. Excavation of the site proceeded by opening and expanding on three trenches that developed into an excavation unit about 12 meters x 8 meters with

a dogleg trench extending 33 meters downslope. Although the deposit was 8 feet deep and visibly stratified into 3 levels, the stratigraphy could not be consistently followed and excavation proceeded in arbitrary vertical units of 6" and 12."The dune eventually yielded evidence of 21 pitstructures including 11 pithouses, 3 cists, one kiva, and 6 unidentified structures (Figure 69). Several of the structures were only defined in the walls of the excavation unit. A considerable amount of deposit on site appears to remain intact.

Aikens grouped the structures into six sequentially occupied complexes - the sixth (Structures 19, 20, and 21) represented the final occupation (Figure 69). In the absence of any absolute dates, as was the case at the Sand Hills site, Aikens assigned Bonanza Dune to the period A.D. 900 - 1200 based on ceramic cross-dating. The presence of a fully subterranean masonry-lined "kiva" in the uppermost occupation indicated an obvious late component with numerous earlier shallow benched pitstructures divided into 5 earlier complexes. A review of the ceramic assemblage tabulations (Aikens 1965: Table 1) indicates that only 22% of the grayware assemblage is corrugated and virtually all of it is associated with Complex 6. A recent inspection of remaining surface sherds, and the photo of a St George Black-on-Gray bowl and a Shinarump Gray jar with an everted rim (Aikens 1965:94), indicates that a significant portion of the Bonanza Dune occupation may have occurred during the early puebloan times; the presence of a few Lino/ Mesquite jar rim sherds remaining on site suggests that episodes of occupation could have been continuous since Basketmaker III times.

Architecture.

Unique among the structures at Bonanza Dune was a fully subterranean, masonry lined, "kiva" that initially called attention to the site (see Figures 69 and 122). The structure was 13 feet in diameter with a prepared clay floor surface. Walls were typical of Virgin construction employing coursed masonry set behind vertical baseboard slabs - a Virgin trait remarked on by both Judd (1926) and Steward (1941). A rectangular firepit, lined with four vertical slabs, was located just south of center. West of the firepit were two apparent loom anchors. Of particular interest is Aikens' association of Structure 20 with the kiva and thereby the Late PII occupation: Structure 20 is an Early Pueblo II style pithouse. Jennings (1978) affirms this in his description of the site; "a generalized description of the houses is possible because they were astonishingly uniform in architectural features: All were subterranean, circular, 12 to 14 feet in diameter, had firm-packed floors 1 to 3 inches thick, were lined with vertically set sandstone slabs, and had one or more sand filled pits sunk into the floor and sealed with clay. The significance of the sealed over pits is not known." (Jennings 1978:116).

Of all the pitstructures at Bonanza Dune, only the kiva and Structure 20 (Figure 70) had late pottery in floor contact. Structure 20 had 2 corrugated sherds, 6 Sosi Black-on-White and 100 plain gray. Given the dominance of plain gray sherds, it seems equally plausible that either the late sherds were not in true association and Structure 20 is actually an Early PII period structure, or, that it represents a brief continuation of the traditional Virgin style pithouse architecture into late PII times.

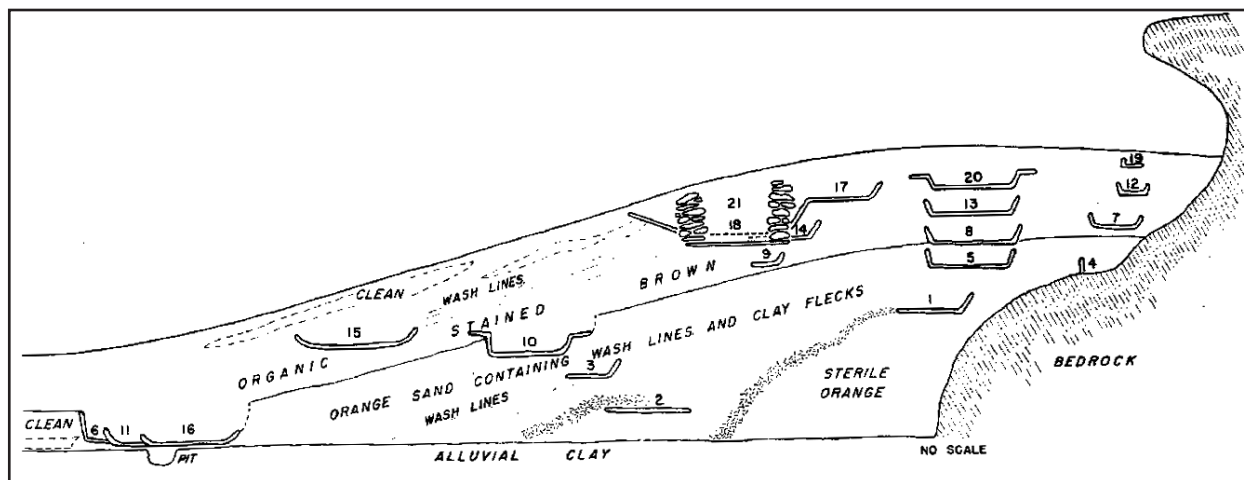


Figure 69. 42Ka1076, Bonanza Dune composite profile (after Aikens 1965).

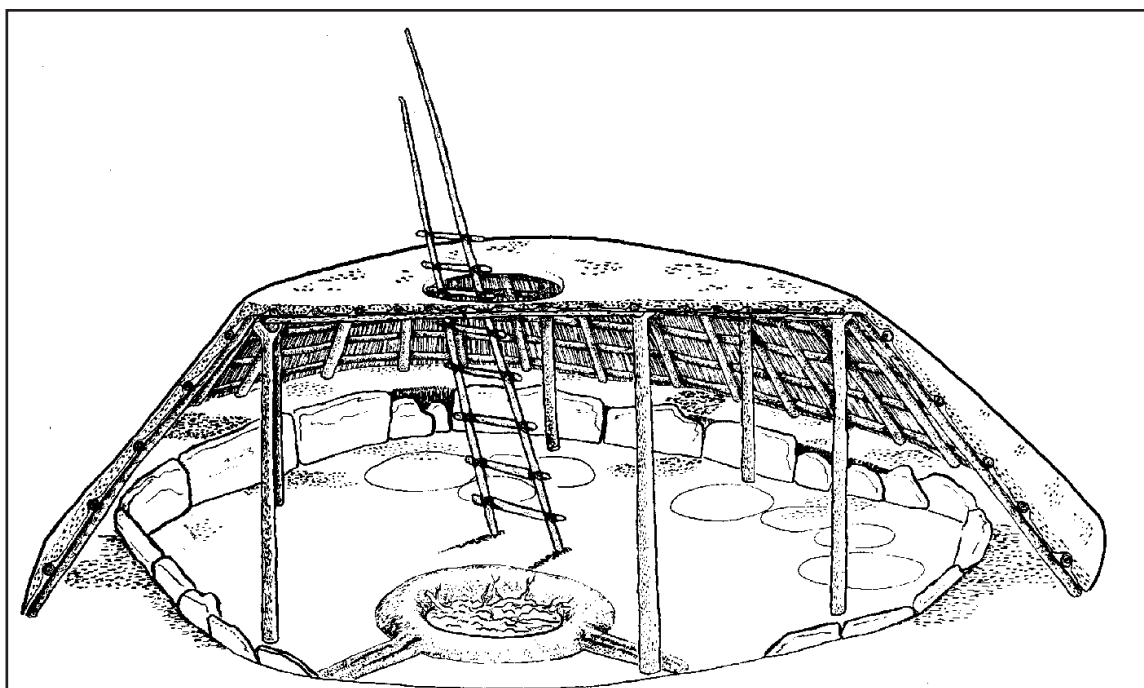


Figure 70. 42Ka1076, Bonanza Dune, reconstruction of Structure 20 (Aikens 1965).

Site Layout and Function

Unlike the extensive Sand Hill Site, which consists of spatially discrete (but unlikely contemporaneous) storage units, the Bonanza Dune occupation is represented by a sequence of superpositioned pithouses that were interpreted as representing episodes of abandonment and reoccupation (Aikens 1965). In fact, both the apparent aggregated layout at Sand Hills, and the superpositioning of pithouses at Bonanza Dune, could be manifestations of the same behavior i.e. periodic shifting by household groups between various agricultural locations.

The Bonanza Dune site layout, as defined by limited excavations, is aberrant given its lack of storage units. Typically we might expect a ratio of two or three storage cists or rooms per residential unit (Dalley and McFadden 1985). At the roughly contemporaneous Sand Hills Site, of the 12 structures excavated, 10 were storage and 2 undetermined; although it would be very difficult to demonstrate, it is entirely possible that storage/residential functions in Johnson Canyon were discrete. Without question the interpretation of both Bonanza Dune and the Sand Hill sites would benefit from additional excavation.

42Ws3119 1996-2000

**(Southern Utah University field school,
Barbara Frank)**

This site lies on a low gradient plain well out from the Vermilion Cliffs north of Canaan Wash at an elevation of 4,800 feet. Recorded and mapped as a nearly circular mound, excavation reveals this multicomponent site to consist of a series of accretionally constructed slab-lined storage rooms with two benched pithouses located to the southeast and apparently two additional dwellings near or under the roomblock. It also has an underlying Basketmaker III component. As yet undated, the site is an excellent upland example of “Virgin pattern” site expansion via remodeling, accretional construction, and superpositioning of structures.

42Ka6293

(Nash 2013)

42Ka6293 is small farmstead located in Kanab Canyon 2 miles north of the City of Kanab. It was excavated by Montgomery Archaeological Consulting as a mitigation project under contract to Utah Department of Transportation for highway 89 improvements. The site was completely excavated and consists of a pithouse, an alignment

of 3 separately constructed storage cists, and activity area consisting of a ramada, three roasts, and a hearth. The layout of these features is typical of an agriculturally focused, sedentary, hamlet during the early Puebloan period (Figure 71).

Ceramics

Janet Halgopian analyzed 3,420 of the 7,732 sherds recovered resulting in an overwhelming 92.5% Virgin Series Gray Ware and 173 sherds of Virgin Series white ware. Only 2.3% was Shinarump plain, a frequency comparable to the Kanab site downstream. The white wares included a few Washington Black-on-Gray sherds, a preponderance of St George Black-on-Gray, and surprisingly, a number of North Creek Black-on-Gray. This type is considered a Sosi Black-on-White analog with a beginning date of about A.D. 1070 in the Kayenta region (Ambler 1985). This somewhat later than the proposed occupation date for the site. No red wares occur on the site. A post-occupational Southern Paiute presence is noted based on a few brown ware sherds; the nature and degree of intensity of their use is not known.

North Creek gray ware jar rim forms during the early puebloan period in both the St George Basin and the Grand Staircase are useful temporal indicators that grade from slightly curving during BMIII times (Figures 30, 31), become more pronounced during Pueblo I, and are fully everted during Pueblo II. Halgopian (2013) notes that most jars were everted, but apparently not all. Given a few Washington Black-on-Gray sherds it is possible that some of the plain gray is early.

Because the site was completely excavated, the ceramic assemblage should be useful to comment on the overall storage capacity of gray ware vessels. As on most early Puebloan sites of this period, gray ware quantities do not appear to be sufficient to have stored the bulk of the households annual maize requirement (see Table 25). Contributing to the analysis of vessel function Halgopian notes that, of the seven jars recovered, 4 were sooted and were probably used for cooking.

Subsistence

42Ka6293 yielded wide range of both domesticated and wild species that compares well with the Kanab site further south. Both pollen and macrobotanical remains indicate that maize was an important resource. Egg shell indicated

the presence of domesticated turkeys (also found at the Kanab site). A charred *Gossypium* sp. seed is a surprise, given that evidence for cotton is not known in the region prior to Late Pueblo II. Absent was any evidence for the use of beans, presumably a result of sampling error. Wild plants included *Chenopodium* sp. (goosefoot), *Atriplex canescens*, (saltbrush), and various grasses. An artiodactyl index of 0.84 indicates that, as at most sites on the Grand Staircase, big game (mule deer in this case) were available and more desirable than small game (see Table 26).

Projectile points

The projectile point collection is typical of Pueblo I and early Pueblo II periods. It consisted of fourteen stemmed and basal-notch types including Rose Spring, Abajo, and Parowan Basal-notched styles. One of the latter, found in the pithouse, was obsidian suggesting a possible Great Basin Fremont origin. The distribution of projectile points over the site, including the pithouse which held all three types, may indicate they were all in use simultaneously (Nash 2013:Table 19).

Dating and occupational sequence

By all appearances this was a single component habitation site occupied by a family-sized unit. The radiocarbon dates, however, suggest a more complex sequence of occupation perhaps beginning in late Basketmaker III or Pueblo I times (Table 12). A tree-ring date of 1023+vv from the pithouse and 1009+vv from the ramada make it one of the more securely dated and latest Early Pueblo II habitation sites in the Kanab drainage. Of particular interest during this critical juncture leading up to the Late Pueblo II period are intraregional relationships, reflected by ceramic frequencies i.e. the Shinarump and North Creek Series, and evidence for interregional contact based on exotic Kayenta types.

Radiocarbon dates, projectile point types, and to a lesser degree ceramics, indicate a BMIII/PI occupation of the site prior to its final pithouse, ramada, cist alignment configuration. Within a half mile north and south are both earlier and later sites (or remnants of them) that also focus on this reach of Kanab Creek; they include BMII (42Ka4478, 42Ka6043, BMIII (42Ka2574) and Late PII (42Ka6043). At any point in time, it appears at least a few families occupied this portion of Kanab Canyon.

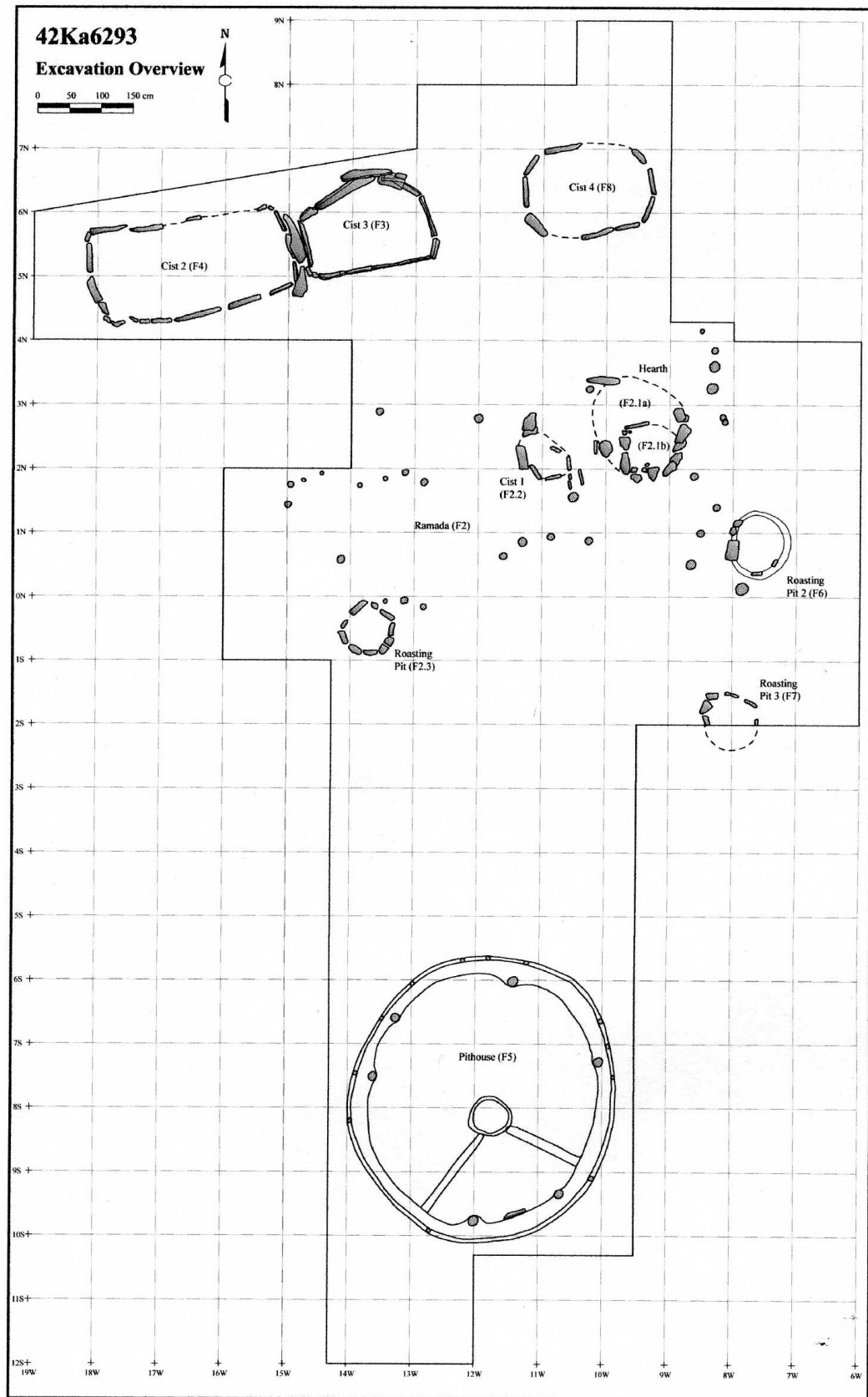


Figure 71. 42Ka6293 plan map (after Nash 2013).

Provenience	Sample	C14 age (BP)	2-sigma (cal)	Intercept (Cal)	Beta#
Ramada (F-2)	Charred corn cob	1170+/-40	AD 770-980	AD 880	252926
Ramada (F-2)	Charred bean	1460+/-40	AD 540-650	AD 610	252924
Cist 2 (F4)	Charcoal	1340+/-40	AD 640-720 AD 740-770	AD 660	252925
Roasting Pit 3, (F7)	Charred corn cob	1340+/-40	AD 640-720 AD 740-770	AD 660	252927

Table 12. Radiocarbon dates from 42Ka6293 (after Nash 2013).

Storage capacity and field size

Three storage cists per habitation unit is a typical ratio during the early Puebloan period. Nash provides estimates for the volume in the three cists (see Table 25) as well as estimates of field size. Depending on how the maize was processed, shelled or left on the cob, one or more of these cists would have been adequate to store enough maize for a family unit for a year or two. Based on their trash fill, Cists 2 and 3 may have fallen into disuse with only Cist 4 remaining open at abandonment. If that actually was the case, Cist 2 and 3 might represent the earlier of two occupational episodes.

Estimates of yield per acre for maize vary widely (see Wilshusen 1986), as would actual yields in any given year. Nash estimates production of 12-18 unshelled bushels per acre requiring a field size of 11.90 to 17.86 acres to fill the 3 cists with unshelled corn. Wilsulsen, slightly more optimistic, estimates 10 bushels of shelled corn per acre or 20 bushels of unshelled corn per acre (assuming here twice the volume for unshelled). At any rate, the alluvial deposits along Kanab Creek adjacent to the site could have easily accommodated a field area of 20-40 acres either sub-irrigated, dryfarmed, or pot watered if necessary.

Pithouse architecture

Pithouse architecture is one of the more uniform and consistent traits during the early Puebloan periods on the Grand Staircase. That said, the layout and construction of 42Ka6293 is a departure from the norm in that it incorporates both early and late characteristics (see Figure 118). The primary early trait are wing walls/floor ridges extending out from the clay coped hearth (see Judd's Cave 5 (1926:113), Park Wash pithouse F5, Dead Raven Pithouse1). The wing walls at Judd's Cave 5

were buried timbers covered by adobe mud about 3" high. The Park Wash site late BMIII pithouse had a similar remnant, the overlying Pueblo I pithouse did not. In fact, most early Puebloan Virgin sites have some sort of demarcation for this quadrant of the pithouse. The vent shaft and lack of a antechamber or niche appears to be similar to Pithouse 1 at the Dead Raven site (See Figure 67).

Lack of a true bench and the absence of floor pits and features are perhaps the most obvious departures from the early Puebloan style. Relatively deep, plastered walls with support posts incorporated into the walls are construction features that appear in Late Pueblo II times (but see 42Ka2147 for another "nonconforming" pit structure). Size of the pit itself is comparable to the interior pit of a benched house and the overall diameter of a fully subterranean structure.

Discussion

The pithouse architecture might be viewed as "transitional" in that it incorporates some early Puebloan traits, lacks others, and displays some that are common in late Pueblo II times. Considering exotic trade items i.e. cotton seed, obsidian, *Olivella* sp. shell, and a broad-lined white ware style - all indications of external relationships at this point in time, may do violence to the proposition that the Late Pueblo II period was a sudden and "transformational" break in cultural continuity. As regards defining a "Middle Pueblo II" period, 42Ka6293 makes a substantial contribution to describing the material culture leading up to it. The critical temporal gap in the record is now A.D. 1050-1100. What is needed to clarify the situation is architectural and artifactual data from sites that fall into the temporal range of A.D.1050-1100.

LATE PUEBLO I I SITE DESCRIPTIONS

42Ka1504 (Judd's Cave 6) Cottonwood Canyon Cliff Dwelling

At present, this is the type site for describing the Pueblo II “expansion” and onset of the Late Pueblo II period. The architectural types and ceramic assemblage have come to define the period. As one of the better dated sites in the region, its tree-ring date cluster around A.D. 1100 represents the latest possible terminal date for the Early Pueblo II period and a minimum age for the onset of the Late Pueblo II period.

Neil Judd recorded this site as Cave 6 in 1919 and described it as “the largest Cliff-dweller settlement visited by the writer during his archeological observations north of the Rio Colorado (Judd 1926). The site is located in a large south aspect alcove in a tributary to Cottonwood Canyon at an elevation of 5,960 feet. Nineteen rooms and one kiva were identified (Figure 56). Judd was impressed with the preservation of the site and documented it with a number of photographs (Figure 72). The site is on the National Register of Historic Places and remains one of the best examples of standing architecture in the Virgin area.

Of the nineteen rooms all but one (and perhaps Room 4) appear to be storage units, several are quite small. Their layout may have been affected by

incorporation of granaries from the earlier Pueblo I occupation (see Pueblo I site descriptions). Rooms 7, 8, 9, 10, and 11 appear to comprise a single storage unit appended to Room 12 which was considered by Judd to be a dwelling (Figure 56). Room 12 was a composite of masonry and jacal construction; presence of a window, slab-lined floor bin, and smoke smudged interior make it stand out from the other rooms. Judd noted 7 thin washes of adobe on the ceiling. As a group, the rooms form a southeast oriented courtyard adjacent to the kiva. Considered as a unit, this grouping would have provided a lightly constructed summer residence, a well insulated subterranean winter residence, and higher than average storage capacity for a household.

To maintain its structural integrity the “Cottonwood Canyon Cliff Dwelling” was stabilized in 1966 by Utah State University (Keller 1966) and again, after a particularly vicious bout of looting, in 1985 (Tipps 1989). During this latest round of stabilization excavation in and around the “kiva” determined that its fill had been completely removed by looters and backfilled. Removal of the looters spoil on northwest revealed that the Late PII builders of the kiva had cut through an early puebloan style, slab-lined pithouse (Figures 73, 74; see also 42Ka1504 Pueblo I description).



Figure 72. 42Ka1504 photo circa 1919 (Courtesy of the Smithsonian Institution).

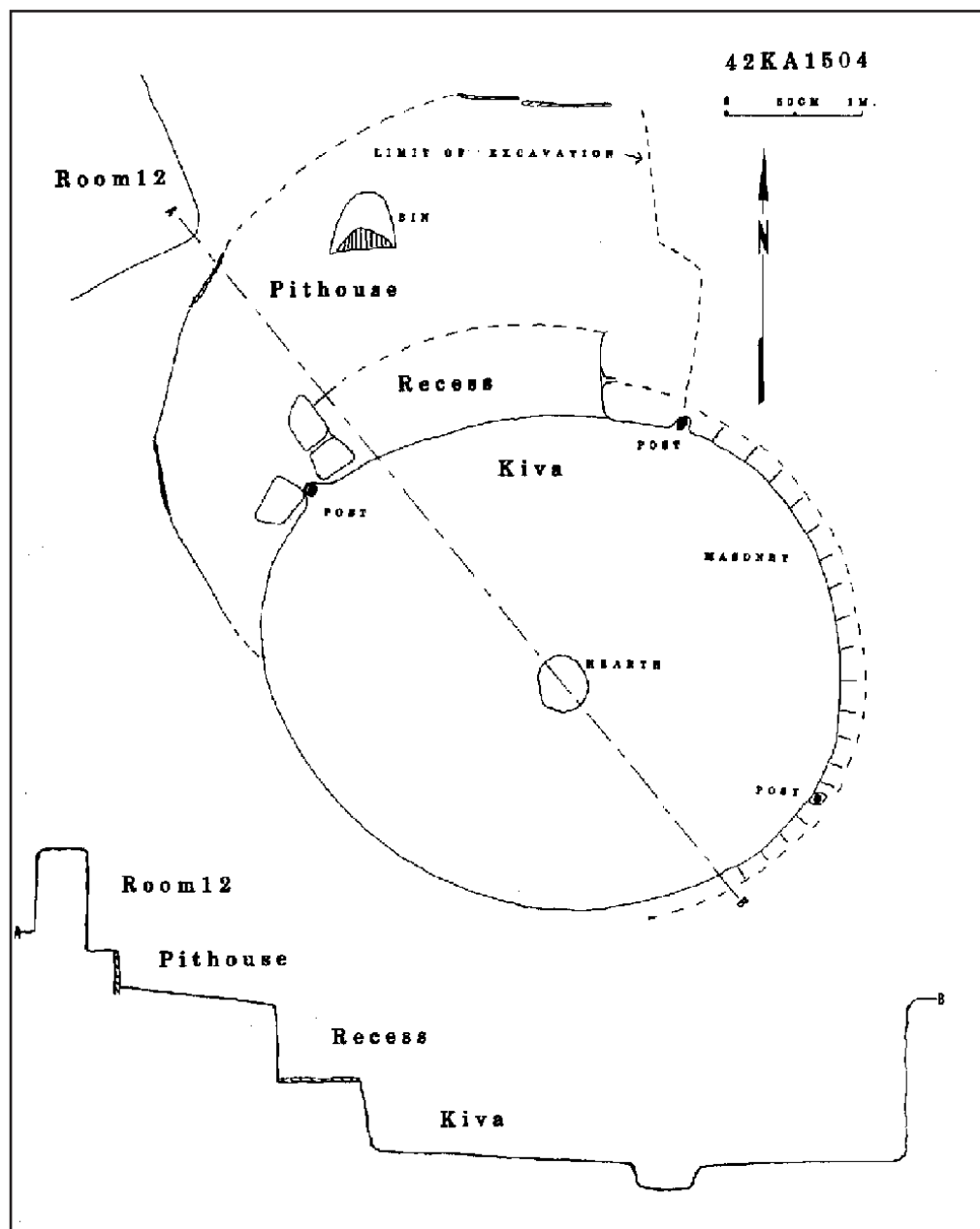


Figure 73. 42Ka1504, plan and profile of Room 12, pithouse, and kiva.



Figure 74. 42Ka1504, view to northwest of kiva, pithouse floor, and Room 12.

Kiva Description

Although damaged, the basic features of the kiva were definable. The structure was mostly, but possibly not entirely, masonry-lined. Slab uprights lined at least part of the perimeter. The entire structure appeared to have been plastered. The floor was damp, compacted clay with a slightly off-centered, circular hearth with some clay coping remaining. The floor was disturbed in places by the looting but did not have any additional features. The most conspicuous feature was a recess on the northwest framed by pilaster-like masonry with post molds visible on each side (Figures 74 and 122). Fill was screened and yielded abundant artifacts including cordage, hair, an arrow shaft, three projectile points and sherds.

Dating

Twig sized charcoal on the floor of the early pithouse yielded a 2 sigma radiocarbon date of cal. A.D. 720-735, A.D. 760-1020 with a calibrated midpoint of A.D. 895 (Beta 26630). The date confirms the impression that the structure was early Puebloan - probably best considered Pueblo I. Although the clay-coped hearth in the superpositioned "kiva" was damaged by looters, it provided an undisturbed sample of charcoal that yielded a conventional date of 840+/-B.P. with 2 sigma calibrated results A.D. 1020-1295 (Beta-24402).

Virtually no artifacts were found in situ during the kiva and pithouse excavations. One notable exception was a large sherd of Citadel Polychrome found immediately under wall-fall from the adjacent Room 12 (see Appendix D, Figure 5). Ambler (1985) dates Citadel Polychrome to post A.D.1090 during the Klethla Phase. Two large panels were recovered from the kiva spoil; a Medicine Black-on-Red and a Dogoszhi Black-on-White sherd are among the latest types represented on site (Figure 75). Twelve tree-ring specimens found on the surface of the site or disturbed contexts yielded 7 remarkably consistent dates: 1054vv, 1099r, 1099rb, 1101r, 1101rb and the latest, 1111vv.

Dean Wilson (1989) reports that of the 1,971 sherds recovered, 1,213 (62%) were corrugated; of the total 1,371 sherds were Virgin Series, 600 sherds were assigned to the Shinarump Series. Exotic pottery was limited to 22 sherds assigned to Tsegi Orange Ware (1 Medicine B/R, 1 Tusayan Polychrome and 19 indeterminate). Notably, no Middleton Red Ware occurred in the collection. The whiteware assemblage consisted of 94 sherds assigned to the Virgin Series and 18 to the Shinarump Series. Sosi (North Creek B/G) and Dogoszhi (Hildale B/G) designs were present on both series. Wilson attributed none of the white ware to Kayenta origins but noted the possibility. A few sherds of Washington b/g and St. George B/G probably represent the earlier occupation.

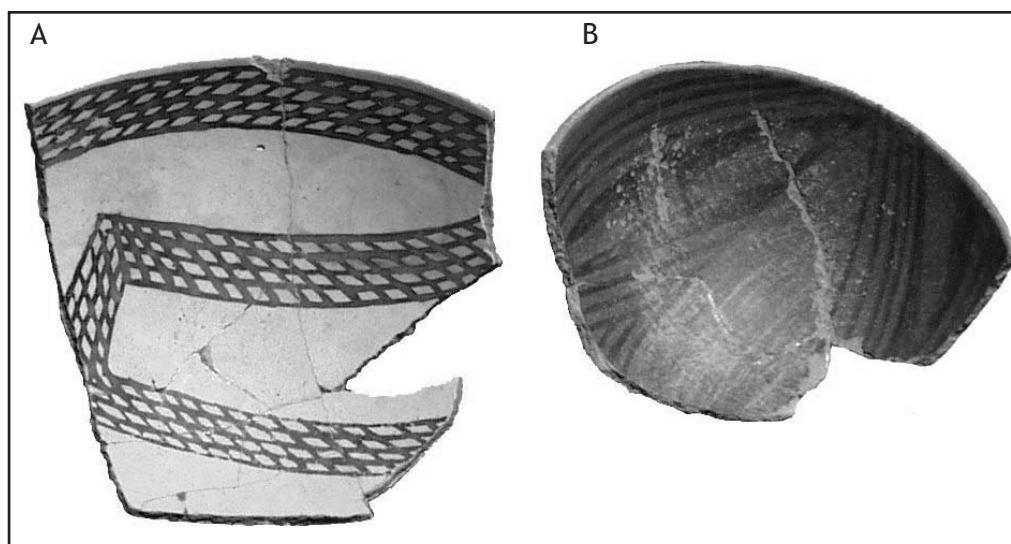


Figure 75. Large ceramic panels from the fill of the “kiva”, 42KA1504; (A) Dogoszhi Black-on-White; (B) Medicine Black-on-Red.

42Ka1812 (Judd’s Cave 3)

This site, also called Kiva Cave, was first observed by Judd in 1915. He returned in 1919 and excavated what he considered to be “the first semisubterranean ceremonial chamber we recognized and excavated in southwestern Utah” (Judd 1926:98). Associated architectural features include a well-preserved residential masonry room (Room 2) and separate masonry storage room (Room 3), both with intact roofs. These are the primary Late Pueblo II style rooms on site. In addition was a storeroom (Room 4) in poor condition and without a roof. Judd noted that Room 4’s interior was lined with slabs. The fourth structure in this cluster of rooms was the partial remains of a four foot square room of composite construction (Figure 76).

Other features of interest include three slab-lined mealing bins associated with the latest occupation. Judd noted the lack of “baseboard” slabs in Rooms 2 and 3 and their presence in dismantled Room 4 - a contrast with possible temporal significance. Recent observations of both Early Pueblo II jar rims along with apparent Dogoszhi Black-on-White and Tusayan Corrugated sherds suggest the possibility of both early and late occupations.

Judd had little doubt that the pit structure functioned as a ceremonial kiva, although he admitted that it lacked several features kivas normally exhibit, at least in the San Juan area. It was one of three kivas he observed in Cottonwood

Canyon; the second was in Cave 8, and the third was the “possible kiva” in Cave 6 (Judd 1926:114).

Kiva Description

Circular and measuring 13 feet 6 inches (4.1m) in diameter Judd described the structure as only partially subterranean (Figure 77). Recent observations indicate a 2m x 3m feature with at least 6 courses of masonry on the northeast; the actual association of the niche-like feature with the room is unclear. The hearth is slab-lined, there is no deflector between it and the vent shaft on the southeast. The tunnel-like vent was 14” x 18” walled and paved with adobe covered slabs and roofed with sticks covered with cedar bark (Judd 1926:102). The vent opening in the wall was covered with a dressed slab.

Masonry Rooms

Judd’s measurements of Room 2 are 10 feet x 13 feet - it abutts the back wall of the shelter (Figure 78). The roof is a matrix of willow twigs, juniper bark, covered with adobe resting on poles of 2-4 inches supported by larger beams. A radiocarbon assay obtained from a short-lived riparian twig taken from the roof yielded a conventional date of 890 +/- 50 B.P., with a calibrated 2 sigma range of A.D. 1020-1260 and a calibrated intercept of A.D. 1170 (Beta-168673). The lack of radiocarbon dating precision for this critical period is disappointing.

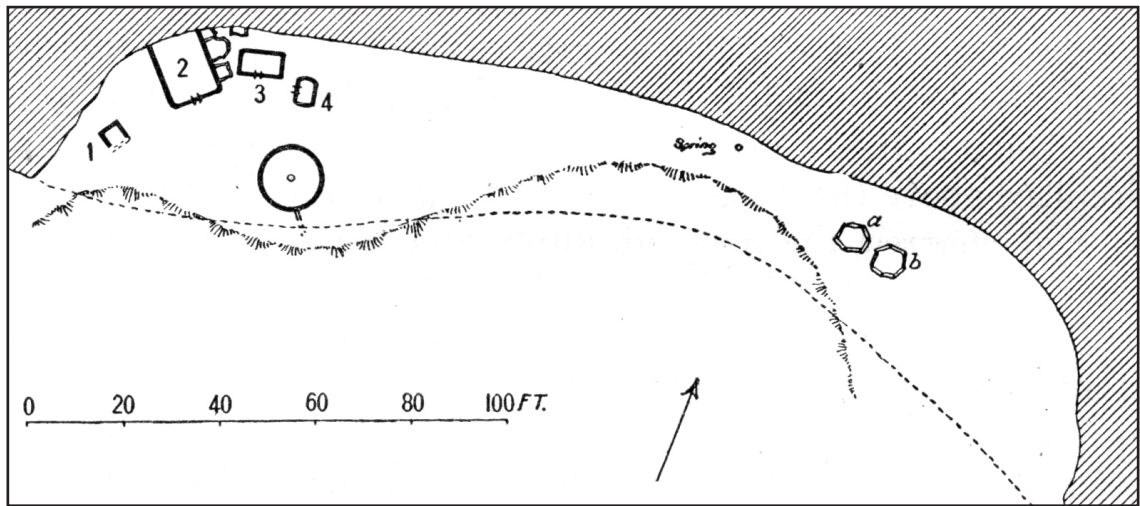


Figure 76. 42Ka1812, plan of Cave 3 (after Judd, 1926).



Figure 77. 42Ka1812, Cave 3 "kiva", 1977 photo.



Figure 78. 42Ka1812, Room 2.



Figure 79. 42Ka1812, Room 3.

Room 2 does, however, have excellent tree-ring dating potential.

Judd thought that the entry to Room 2 had been reworked and noted a clay-rimmed hatchway in the roof apparently covered with a dressed slab he found on the floor. Wall pegs, two “windows”, lack of door closure holes, perhaps roof construction, and relatively large size (130sq ft) indicate the structure probably always functioned as a dwelling. Although the walls and ceiling are sooted, no hearth was described by Judd nor is one visible today.

Room 3 provides excellent construction detail for granary architecture (Figure 79). Apparently greater care was taken with the roof which consisted of eighteen poles bound together with lacings of willows covered with adobe (see 42Ka1694 for similar construction). A 17”x24” entry has holes on either side, presumed to hold loops with which to hold the door slab in place (Figure 79).

Room 4, partially collapsed when Judd described it in 1919, appears to be a storage room. Judd describes an entry sill on the west 18 inches above the floor and an opening 24 inches high. Unlike Rooms 2 and 3 it was lined with “baseboard” slabs. No dimensions are provided but the room is somewhat smaller than Room 2. It seems possible Room 4 was constructed earlier than Rooms 2 and 3.

Judd described an apparent earlier occupation on the opposite end of the alcove consisting of two large cists, 1.7m and 1.82m in diameter, with evidence for roughly plastered masonry superstructures. This description is very much like that for Pueblo I circular storage rooms (see Figure 58).

Judd had little to say about ceramics, other than their presence or absence. On many sites, including

Cave 3, most midden debris is assumed to be on the Oak brush covered slope below the site. Dogoszhi Black-on-White designs and corrugated sherds have been noted. The presence of two everted Early Pueblo II style jar rims evidences at least some use during that period..

Also of note, he mentions anthropomorph pictographs behind rooms 3 and 4 in white, red, and yellow clay that did not appear to be Basketmaker. These figures are still visible and include a geometric design - cf. Site 7 in Mollies Nipple Canyon (Steward 1941:321); and a faint “local” anthropomorph figure (see Figure 45).

Judd's Cave 4

Judd recognized the multi-component nature of many of the sites in his Cottonwood Canyon investigations but Cave 4, a south aspect shelter, provided the clearest example of actual superpositioning (Figure 80). His plan map clearly illustrates masonry rooms overlying jacal and slab-lined pitstructures with benches typical of Pueblo I (see Figures 73, 74) and Early Pueblo II, but possibly Basketmaker III as well. Assuming the masonry, although crude, represented a “cliff-dweller” occupation, overlying an earlier one, Judd was surprised that potsherds from the two occupations “exhibited no differences in either vessel form or body decoration.” We must assume from this description that the utility ware was plain gray and that corrugated pottery was not represented.

Judd was intrigued by the construction sequence which clearly indicated two “levels of occupancy” represented in only 18 inches of deposit (Judd 1926:104). He remarked about the clear superpositioning of structures, the accretional

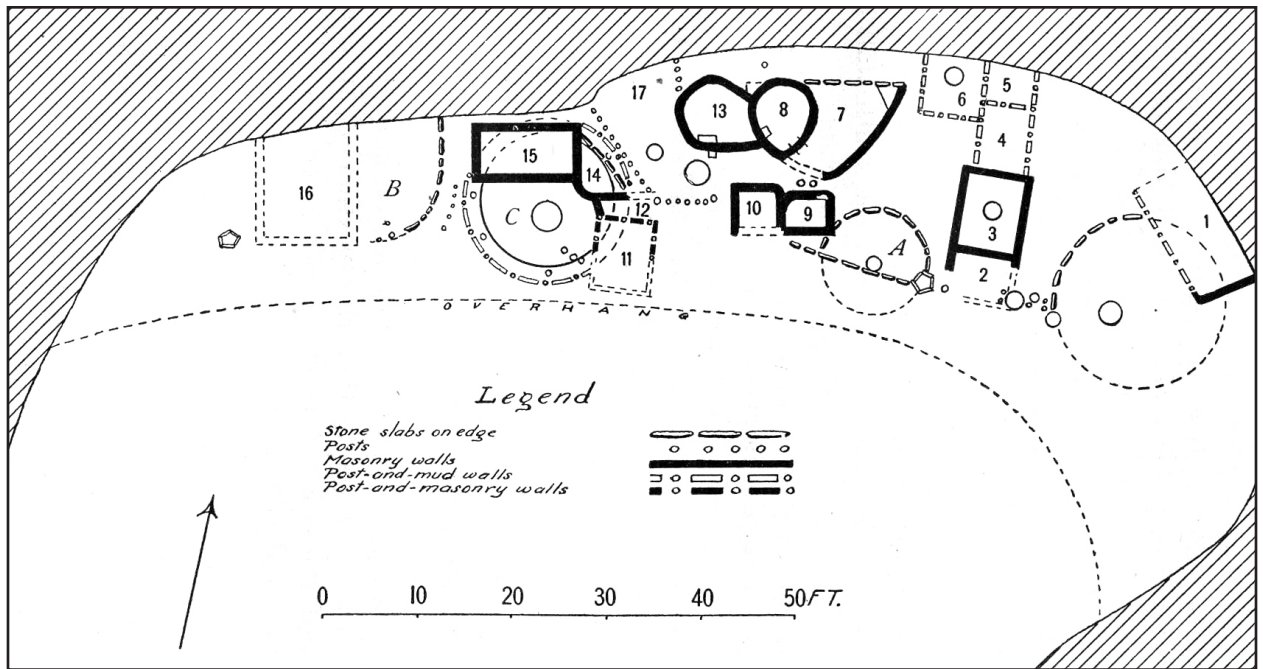


Figure 80. Plan map of Cave 4, after Judd 1926.

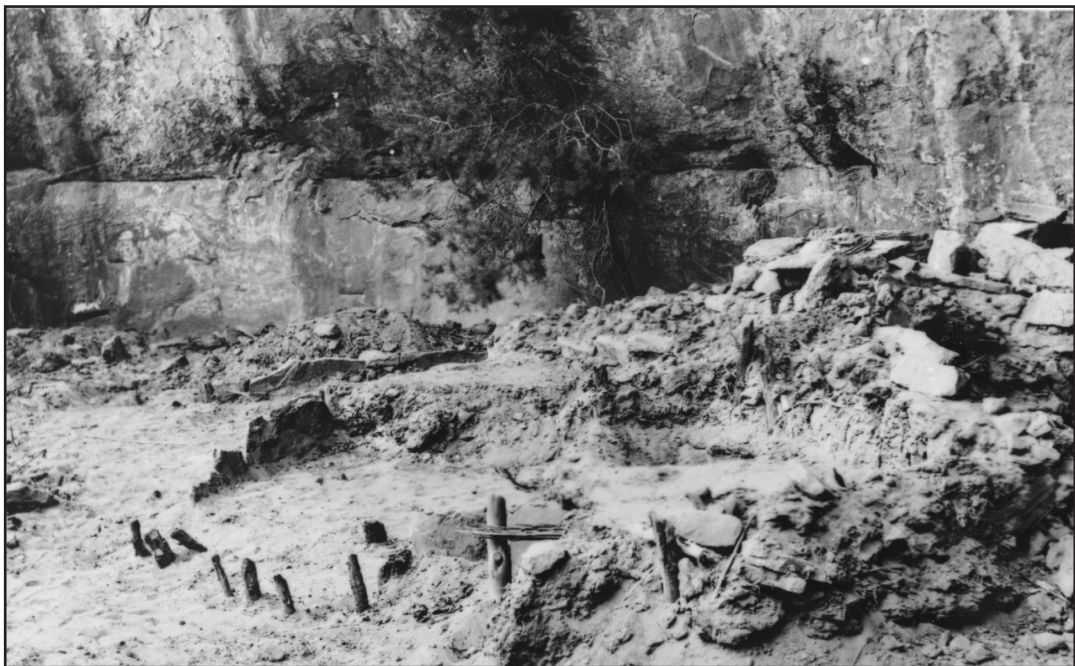


Figure 81. Cave 4 superpositioned masonry, Room 15, over pithouse structure C (Courtesy of the Smithsonian Institution).

construction of rooms, and the incorporation of earlier remnants into later rooms. He concluded that "But these several distinct (structural) types are all closely associated in Cave 4; the too-limited collections of cultural artifacts recovered during our excavations point unmistakably to continuous, through relatively brief, occupancy of the site by the same family groups." (Judd 1926:111).

What seems to have confounded Judd was the use of masonry prior to the Cliff-dweller i.e. late PII period. Apparently he did not recognize the (transitional) architecture and pottery representing PI and EPII. While he noted the outward resemblance of Room 8 with Riggs Cave Room 1(a previously described Pueblo I site), because it was constructed of masonry rather than adobe bricks, assumed it was late, i.e. Cliff-dweller (Judd 1927:117). Based on other sites reported in this volume, it is clear that crude masonry was being constructed during Early Pueblo II times.

An interpretation of the site occupational history, congruent with Judd's description of the pottery (presumably all plain), the architectural types, styles, and construction methods, is that while Cave 4 could have a BMIII component, it consists primarily of Pueblo I style pithouses and curvilinear masonry storage rooms, with an overlying Early Pueblo II occupation represented by rectangular rooms constructed of both crude masonry and jacal. In fact, some of the Pueblo I masonry storage rooms could have continued to be used into the Early Pueblo II period.

The local sequence in Cottonwood Canyon is poorly represented during the Early Pueblo II period just prior to A.D. 1100 (represented by Judd's Cave 3 and Cave 6, this volume). At this point, Cave 4 represents the best opportunity to identify an Early pueblo II presence in Cottonwood Canyon. Examining Judd's ceramic collection and tree-ring dating the abundant wood protruding through the deposits, might fill this gap in the Cottonwood Canyon local sequence.

42Ka1497 (Judd's Cave 8)

One of the larger, south aspect alcoves in a well-watered tributary of the Cottonwood Canyon, Neil Judd hurriedly tested this site in 1919. At that time the site was in poor condition from both digging and cattle trampling but held substantial

deposits he suspected might be Basketmaker. Judd noted axe and awl sharpening grooves on boulders, evidence for several groups of surface rooms, and two (masonry) kivas.

Judd investigated one kiva that had been partially excavated. He described it as very similar to the kiva in Cave 3: 14 feet three inches in diameter, masonry lined, five feet six inches deep with an additional foot of dislodged masonry, and posts built into the wall at fairly regular intervals. Collapsed ceiling beams were encountered in the fill. On the south was a ventilator opening eight and one half by twelve inches with a vertical adobe lined shaft beginning eight inches within the tunnel. Three feet from the vent was an unrimmed basin hearth. Between these two features was a deflector made of waddled screen between two upright sticks.

The second kiva was associated with masonry rubble on the west end of the shelter and was not investigated. Some distance from the first, and separated by large spalls from the shelters ceiling, it may represent a second household unit. This in the only site in the area with two possible kivas.

The post-and-mud (jacal) structure, occurs on the bench below the masonry rooms and kiva. Judd described its fill as trash including pottery, corn, beans, squash stems and rind as well as rubbish from razed buildings. Whether it is contemporary with the latest occupation or earlier is not clear.

While Judd mentions pottery was abundant, and the latest occupation was "Cliff dweller", he provides no description of the types. Potentially datable timbers may be associated with each of the three subterranean features.

42Ka1819 Trail Canyon Alcove

This sheltered site is located in a tributary to upper Kanab Creek and is located just a few miles from Judd's Cave 3 and 6. Like those sites, the major architectural features are a masonry lined subterranean pitstructure and a block of masonry rooms (Figure 82). The site occurs in a similar setting located under the rim of a steep canyon in a southwest facing alcove with a nearby spring. The potential for farming in the narrow canyon seems negligible, but the sites location provides easy access to dryfarm settings above.

On the west end of shelter there is little indication of architecture on the level surface but

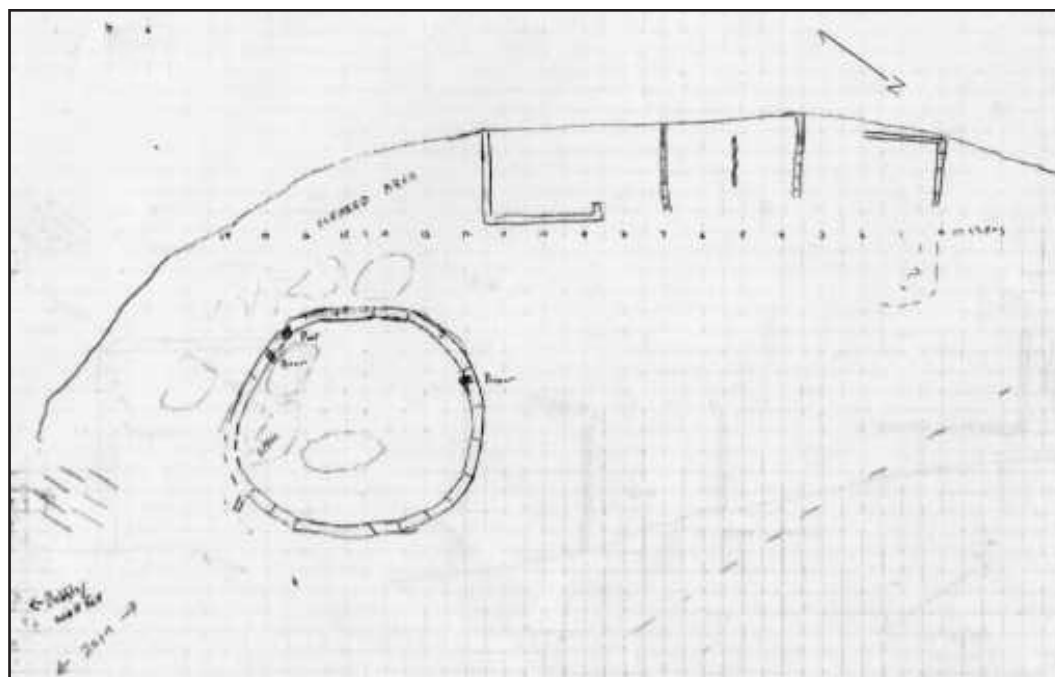


Figure 82. Trail Canyon Alcove 42Ka1819, plan of the shelter's east end.

minor digging has exposed ashy deposits indicating potential for intact stratigraphy. Faint pictographs, apparent BMII style figures, occur on the back of the shelter.

The masonry pit structure is sub-circular and nearly six meters in diameter. It has obvious similarities with the masonry lined "kivas" at both 42Ka1504 and Riggs Cave. It is lined with small, rough, angular rock with a heavy coat of plaster remaining on most of the interior surface. Two posts integrated into the masonry are visible on the north and east. At present the top of the exposed masonry is just above the modern surface with nearly 50cm of masonry exposed on the interior. A few large roof spalls on the fill seem to indicate it is undisturbed. (Figure 83).

Remnants of four or five masonry rooms are located east of the pit structure along the back wall of the alcove. Room 1 is the best preserved with walls about 5 feet high. It is also the largest measuring a little over 4 meters long and 2 meters wide. It is constructed with thin slabs plastered on both the inside and outside. An incised design on the exterior, an impressed design in the plaster on the inside wall, a small slab shelf, and wall pegs set it apart from the other rooms. Remnants of clay coping indicate a high entry (1m) suggesting it functioned as a granary although the opening now extends to the ground level (Figure 84).

Rooms 1, 2, and 3 are similar in terms of style and quality of masonry and may have comprised a single roomblock - although possibly modified over time. Room 4 consists of two wall remnants somewhat more coarsely constructed of rock set in large amounts of adobe. Unlike the others, it is not built against the back of the shelter. There is some indication that it, or an additional room, extended to the southwest.

Dating

In addition to two tree-ring specimens submitted to the University of Arizona (an in situ roof support post and a surface timber), three radiocarbon samples were submitted to Beta Analytic: FS1, a corn cob (irregular, 10 row, 9.5 cm x 1.8 cm); FS2, a corn cob (irregular row, 5cm x 1.8cm); and FS3, the exterior rings and bark from the previously mentioned tree-ring specimen found on the surface.

The radiocarbon dating results general confirm the assignment of the surface architecture to the Late Pueblo II period. The FS-1 corn cob (Beta-161895) 1 sigma range (68 %) is Cal A.D. 1000 - 1060 and 1080 - 1150. The FS-2 structural sample (Beta- 161897) 1 sigma range (68%) is Cal A.D. 1030 - 1180 with multiple intercepts with the calibration curve at A.D. 1060,1080 and 1150. The FS-2 corn cob (Beta-161896) suggests a previously

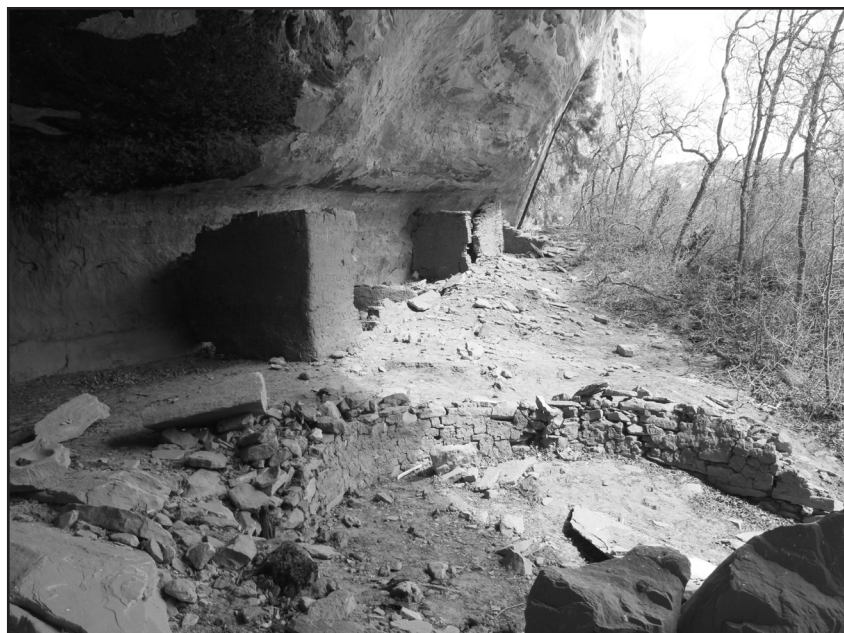


Figure 83. 42Ka1819; view to east of pitstructure in foreground and masonry rooms.

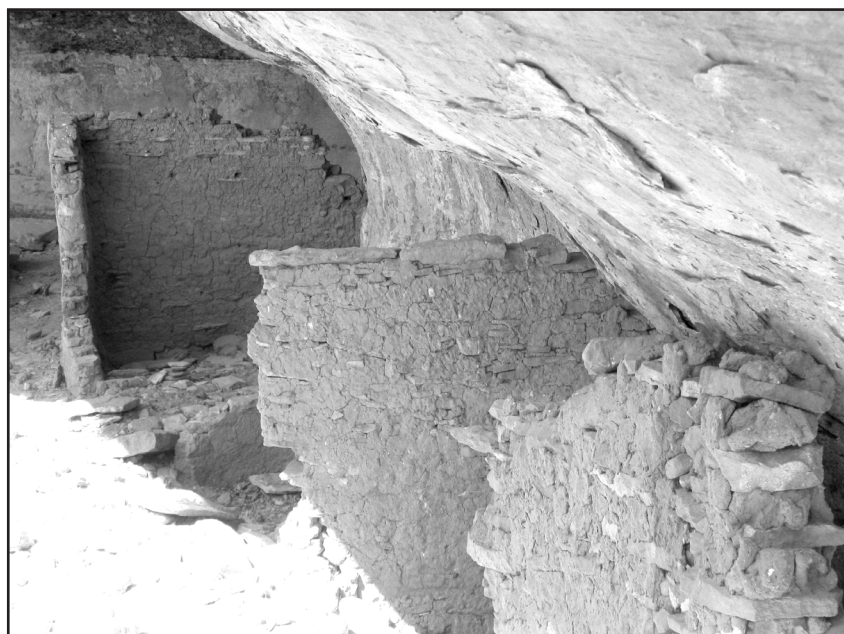


Figure 84. 42Ka1819, view to north of masonry rooms.

undetected Basketmaker occupation at 2 sigma Cal A.D. 540-770.

A collectors pile of sherds examined during a 2014 visit to the site included both Basketmaker III and Early PII rim forms, as well as corrugated sherds from the late occupation. All were apparently North Creek Series; two fine-lined white wares with light paste are probably Kayenta series.

42Ka1520 Bay Bill Shelter

The larger of two granaries (see Figure 64) on this site was stabilized in November of 2000 (Fritz and Fiero 2001). At that time, nine juniper beams were collected, submitted to the Laboratory of Tree-Ring Research and successfully dated. Taken as a group, the specimens exhibit strong clustering around A.D. 1150. The timbers range in size from 80cm to 215cm and all 9 were burned on one end

and either splintered (4) or rotted off (5) on the other end. Judging by those with splintered ends, the intended length for all, or most, was about 2 meters. Their dimensions are similar to those the larger granary (Figure 85).

Five of the nine specimens dated were found lying together in a stack about 6 meters down slope from Structure 1 and were probably placed there about 1970 when the site was recorded. The other 4 were displaced and scattered around the site. Post occupational disturbance aside, the fact that their dates cluster strongly around A.D. 1150 suggests that they represent timbers cut during a single episode of activity. Juniper and pinyon is abundant on the mesa top. Because the existing structures on site are intact, it is unlikely they were salvaged from an earlier episode of construction. Instead, they appear to have been cut and stored in anticipation of future construction.

Jeffrey Dean comments, "All nine samples from 42Ka1520 were dated. Seven cutting and non-cutting dates form a tight cluster between 1147 and 1150+. Plus symbols indicate that zero to three rings could be missing from six of these samples and suggest that all six timbers were acquired at the same time. The two non-cutting (vv) dates in the cluster (UTM 99 and 104) were undoubtedly acquired at the same time as the others. The vv

symbols probably indicate the loss by weathering of enough external rings to place cutting of UTM 105 and 107 at the same time as well. Thus, all nine trees probably were felled together in 1150 or 1151." (J. Dean letter of 26 Dec. 2001).

Interpretation: "An event that never happened"

The earliest structure on 42Ka1520 is a Pueblo I style bedrock storage cist with a superstructure of encircling courses of masonry. Next in the sequence of site use is a "D" shaped masonry storage room. A twig, impressed in the masonry yielded a 2 sigma radiocarbon date of A.D. 980-1235 (Beta 134476). Given a calibrated midpoint of A.D. 1040, a preponderance of plain gray ceramics on site and a sherd of St George Black-on-Gray, as well as the architectural style of the room, and Early pueblo II age (A.D. 900-1070/1100) for the structure seems secure. Although no architecture from the Late Pueblo II Period is represented, and only a single sherd of North Creek corrugated pottery was observed on site, the nine tree-ring dates obtained from the cache and stray timbers found on site, appear to represent activity on site 50 or more years after the latest structure was built. Clearly, these well-selected timbers represent the intention to rebuild on the site at some point after A.D. 1150



Figure 85. 42Ka1520, roof of granary with dated timbers in background.

- an event that never happened. The site may have been abandoned shortly after the timbers were cut.

42Ka1696 Tiny Shelter

This probable multi-component architectural site is located at the base of a south facing sheltering cliff in a tributary to Kanab Canyon at an elevation of 5,720 feet. While the site layout is at variance with other Late PII sites in the area, the masonry architecture and ceramic assemblage is similar. Two rooms on site have standing walls: on the west

are the remaining three walls of a free-standing, rectangular, masonry room (Figure 86), to the east is a “D” shaped masonry room with vent shaft constructed against the cliff-face (Figure 87). A tree-ring date of 785-1111++vv was obtained from one of three juniper beams resting on the wall. The non-cutting date provides the oldest possible age for the structure. Based on architectural style, masonry construction and ceramics, it seems likely the structure is coeval with 42Ka1504, 42Ka1812, and 42Ka1819. Additional features and both petroglyphs and pictographs occur on site.



Figure 86. 42Ka1696 west room, note poorly bonded walls; 1970 photo (Kanab BLM files).



Figure 87. 42Ka1696, “D” shaped room, view to east; 1970 photo (Kanab BLM files).

42Ka6043 Overlook Alcove

The south end of this alcove was described in the Basketmaker II section of this volume. Overlooking Kanab Creek, this portion of the alcove has a south aspect and two masonry structures. The largest is similar in size, shape and construction as the “D” shaped room at 42Ka1694 and therefore could be contemporary (Figure 88). The larger circular room is constructed of masonry and is about 5m in diameter. It is constructed with a ring of slab upright slabs backed by substantial but crude masonry. A series of support posts are incorporated into the masonry just behind or, at least in one case, in line with the upright slabs. It appears that the masonry may have been laid over the posts suggesting that the room had been remodeled.

Three tree-ring specimens within the structure were submitted for tree-ring dating; two timbers were about 1.5 meters long, one was a fragment. A cutting from a fourth timber outside the structure which previously had the end cut off, also about 1.5 long, were found to be undatable - “compressed and erratic” (Appendix B). Ceramics consisted of both North Creek Corrugated and plain. There were no temporally sensitive plain gray jar rim sherds.

The smaller room, a few meters east is roughly circular, 2m in diameter with mortared wall remnants about 75cm high. It is not unlike many

of the structures described in the Pueblo I section of this volume. The site retains good excavation and dating potential.

42Ka5571 Nipple Spring Alcove

This site was recorded by Julian Steward during his 1932 investigations in the Paria River drainage (Steward 1941). He described it as “Traces of stone and adobe walls. Plain and corrugated sherds” (Steward 1941:283). His photograph confirmed the identification: Plate 45a captioned; “masonry cliff house, site 18, Nipple Spring.”

Recorded again in 2000, the site consists of two main cave-like shelters that hold masonry wall remnants and granaries. A third crevice was sealed at one time to form an additional granary. These structures may have been contemporary and complimentary or the result of use over time.

Apparently the site functioned as both a storage cache and as at least a part-time residence.

The larger shelter has a useable floor space of about five meters in diameter and a ceiling height of about two meters. A remnant of a masonry wall spans about one third of the front of the larger cave (Figure 89). The wall is constructed on a 15cm pinyon log that was cut off with a saw. A one meter plus timber, apparently the other end of the log, was found cached at the base of the cliff below the

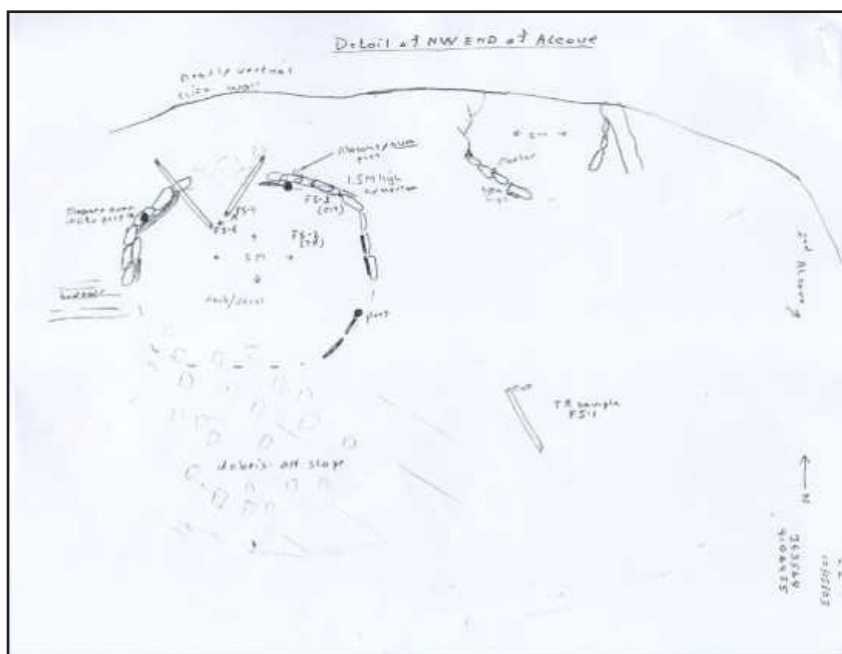


Figure 88. 42Ka6043 plan map of north end features.



Figure 89. 42Ka5571, general view. Note small granary on right and wall remnant at front of shelter on left (from Steward 1941, Plate 45a).

shelter. A section from the well-preserved in situ timber was cut and submitted for tree-ring dating.

Jeffrey Dean writes: “this timber was procured in A.D. 1150 or 1151. The incomplete terminal ring indicates that the tree was cut during the pinyon growing season (summer) of either of those years.” (J. Dean letter of 26 Dec. 2001, Kanab files).

Of historic interest, the tree-ring specimen was cut from the butt end of a timber which was apparently sawed in conjunction with Steward’s investigations in the 1930’s. The faint penciling of the name “Riggs” was visible on the end. Delbert Riggs of Kanab was listed as accompanying Steward, apparently as his outfitter (Steward 1941:282). The dated cutting with Riggs’ name is on display at the GSENM Visitor Center. Brigham Riggs (unknown relationship) assisted Neil Judd with his Cottonwood Canyon investigations in 1915 and 1919.

Rockart in the shelter consists of quadruped petroglyphs and an anthropomorph pictograph; the latter a Cave Valley style suggesting an earlier Pueblo I or Early Pueblo II use. Ceramics on site, notwithstanding Steward’s possible collections, amounted to two sherds; one North Creek Corrugated and a Shinarump Red Ware sherd. The latter appears to be the dominant red ware type after A.D. 1150 and is congruent with the tree-ring

date (Appendix C). The lack of sherds and debris suggests a limited occupation or a logistical function for the site during all periods. The site architecture suggests at least a temporary residential use and a storage capacity that may have varied over time.

Note: The function of this site, presumably an outpost for farming, is of interest given the construction date of A.D. 1150 - apparently in the middle of a severe drought (Benson and Berry 2009). The site setting in a dryfarm situation, at an elevation of 5,760 feet, seems unlikely. A nearby spring may have been a factor in the selection of this location. The construction date is a rather remarkable coincidence with the dates from 42Ka1520.

42Ka1557 (Glass Eye Shelter)

The site form for this sheltered architectural site was upgraded as part of the Seaman Wash Inventory. Obvious features include a series of three linear storerooms constructed of fine masonry set under an overhang. An apparent earlier occupation is indicated by midden development and looted deposits on the slope below the granaries. Pictographs on the ceiling of the shelter include both handprints and geometric designs that appear to associate with the late architecture.



Figure 90. 42Ka1557, Glass Eye granary; overview to southwest (left), detail of entry (right).

The doors for all three rooms have holes for closure loops as well as grooves against which to place the door slab. A wood shaving taken from the door stop of the central room yielded a calibrated AMS date of A.D. 995–1160 with an intercept date of A.D. 1025. The masonry and linear architecture at this granary, as well as its proximity to 42Ka1813, a late unit pueblo, initially suggested that the storage rooms would date late in the Pueblo II sequence. The Cottonwood Canyon sites tree-ring dated to about A.D. 1100, have similar linear style masonry construction (Figure 90). Given its imprecision, the date is difficult to interpret.

Several ceramic vessels were reported to be eroding out of the talus slope in front of the shelter by a concerned member of the public. Salvage of the assemblage revealed a group of seven late Pueblo

II vessels including an obvious incised Fremont jar with handle (cf. Jennings 1978 Figure 126) and two possible Ivie Creek white ware bowls (Figure 91). Fremont ceramics are extremely rare on the Grand Staircase and in the Virgin culture area in general, this is the only reported instance of the presence of actual vessels in a good Virgin Anasazi context.

In several respects the Glass Eye site is not typical of granary sites. Southeast aspect provides a setting suitable as an agricultural camp and associated activities. An alignment of rock forming a cleared area against the back wall of the shelter, awl and “axe” sharpening grooves, midden and an apparent burial suggest either an earlier occupation or multiple activities contemporary with the use of the shelter for storage.

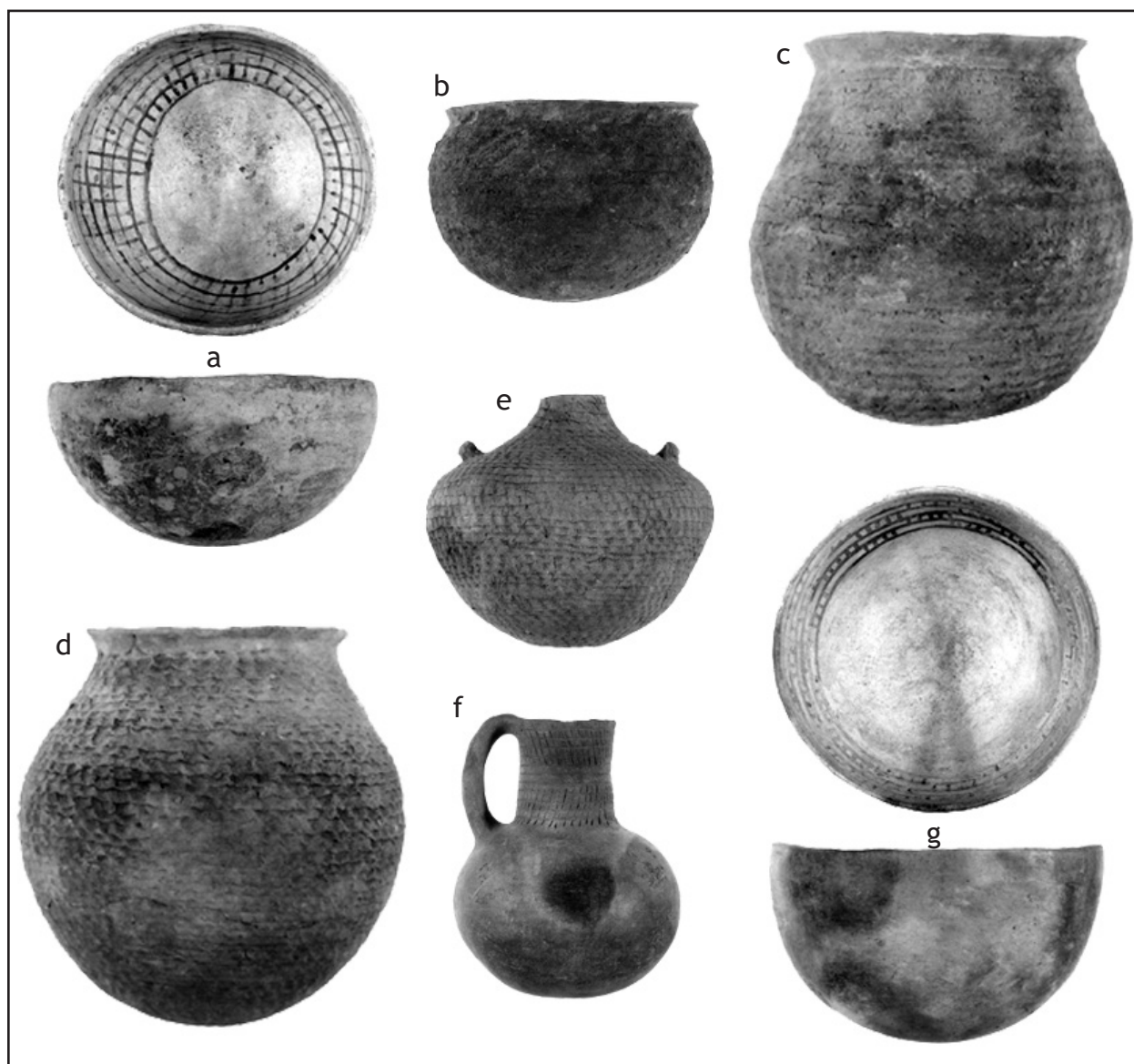


Figure 91. 42Ka1557; Late PII Anasazi vessels (b, c, d ,e), Fremont incised pitcher (f), possible Ivie Creek Black-on-White bowls (a, g).

42KA2664 Kitchen Corral Wash Burials

Structural evidence at this site was almost entirely eroded away leaving two burials exposed in the bank 6 meters above the floor of Kitchen Corral Wash. The site is located on a sagebrush (*Artemisia tridentata*) covered terrace on the east margin of Telegraph Flat at an elevation of 5,360 feet. The level of origin for the burials is approximately one meter below the modern surface.

Burial 1 was represented by a single unidentified bone and three ceramic vessels. The remainder of the interment was lost to erosion. The vessels included a small Moenkopi style jar with handle, a small partial Black-on-Gray bowl with an apparent Dogoszhi style design and a small unidentified black-on-gray bowl (Figure 92; a, b, c).

Burial 2 was partially exposed in the wall of the arroyo a few meters north of Burial 1.

Excavation revealed a nearly intact skeleton that was subsequently described as probably an elderly female (Nickens 1985). Observations relevant to subsistence studies include evidence of periodontal disease, caries, and growth arrest lines that indicate episodes of malnutrition (Nickens 1985). A bone awl (head intact metapodial) and four vessels were associated with the burial including: 2 Moenkopi style jars, a large panel of a Sosi Black-on-White bowl and a plain redware bowl identified as Middleton Red (Figure 92; d, e, g, f).

Macrofossil analysis of the contents of the vessels and deposits beneath the pelvis of Burial 2 yielded *Zea mays* and a large quantity of *Chenopodium* sp. seed identified by Kathleen Heath (N.D.). The seed is curated at the Southern Utah Archeological Repository and would serve well to date the ceramic assemblage.

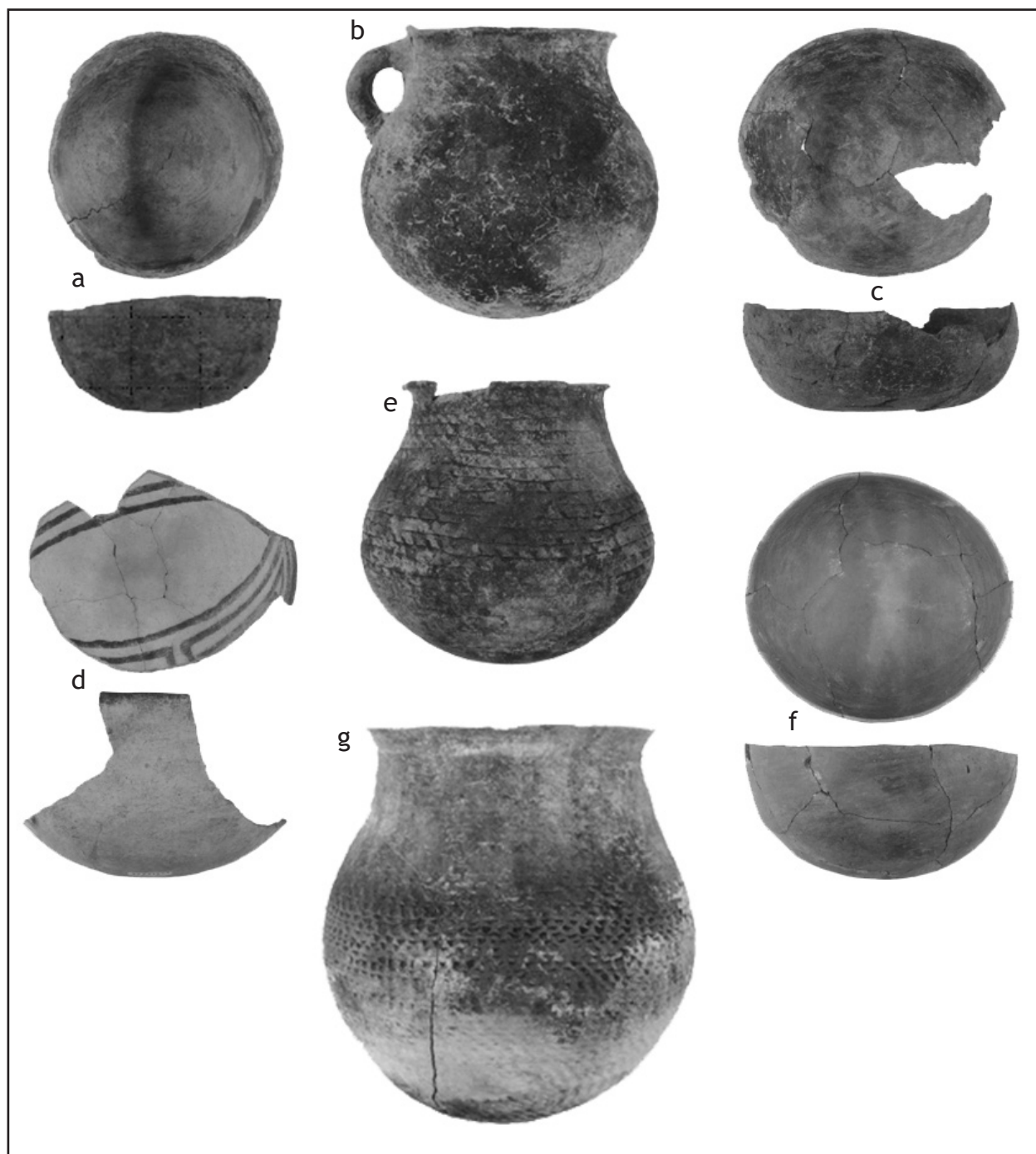


Figure 92. 42Ka2664 vessels: Burial 1 a, b, c ; Burial 2 d, e, g ,f.

42Ka3831 Kanab Creek Archaeological Project

This site is located a few meters west of Kanab Creek on private land within the city limits of Kanab. It was recorded in 1992 as part of the City of Kanab's construction of a new road crossing Kanab Creek. The site was badly vandalized but consists of an area with BMII plain gray ceramics and two separate masonry features, one of which displayed dressed rectangular masonry suggesting a formal Late Pueblo II roomblock. A testing program designed to assess and avoid the site, thereby facilitating a residential development, encountered a burial in the area (McFadden 2007).

Under contract to the Utah Division of State History and permitted by the Public Lands Policy Coordination Office, the remains and associated artifacts were recovered. The burial was associated with two assemblages of ceramics: those directly associated within the burial pit and a sizable collection of sherds deposited immediately above the burial pit. The pottery in direct association included a Washington Corrugated jar and Medicine Black-on-Red panel (Figure 93).



Figure 93. 42Ka3831, Medicine Black-on-White sherds.

Dating on bone collagen was conducted by the Division of State History yielding a Cal. A.D. 1020-1210 date (Beta-243765) with intercepts of A.D. 1060, 1080, and 1150. Because the grayware vessel represents the earliest style of corrugation (Tusayan) and the red ware vessel the earliest type of Tsegi Orange Ware, it seems likely that the burial dates to the late 11th century.

At present Kanab Creek is downcut approximately 10 meters. Assuming the burial is associated with the roomblock, farming along Kanab Creek appears to have been viable around A.D. 1100.

42Ka2584 (Westfall et al. 1985)

This site is located in an upland setting about 900 meters from Kitchen Corral Wash at an elevation of 5,560 feet. It was initially described as a large burned feature associated with an extensive surface scatter of lithic debitage and tools. Excavation revealed a shallow (12cm deep) "pit structure" about 3 meters in diameter with four pits excavated into the unprepared floor. Lack of postholes and pole-impressed clay daub fill indicated a lightly constructed superstructure. Two burned beam fragments yielded radiocarbon dates of: 960 B.P. +/- 50, cal. A.D. 95-1205 (Beta-8419) and 840 +/- 50 B.P. calibrated to A.D. 1045-1105, 1115-1280 (Beta 8420).

Floor contact artifacts included a variety of stone tools including a Parowan Basal-Notched projectile point. Five sherds were found on the floor and a total of 42 were collected from the site; 29 were classified as Shinarump and 13 as Virgin-Kayenta wares. The majority of sherds were plain gray, although a few corrugated sherds were present. A single white ware sherd exhibited a Basketmaker III style. The apparently mixed assemblage led Dean Wilson (1985) to infer site occupations during both Basketmaker III and Pueblo II times. The stone tool assemblage indicated to the authors that the site functioned to support hunting and gathering activities rather than agriculture.

Lightly constructed "pithouses," probably seasonally occupied, are occasionally reported on the Grand Staircase. A similar structure (42Ka2662) was, however, tested by Richard Thompson in Johnson Canyon (see Basket maker III site

descriptions). This structure was also represented by a shallow unprepared floor with at least one clay-lined pit, a partially slab-lined hearth, and a lightly constructed superstructure. Similar to 42Ka2584, storage structures were not closely associated with it, although additional similar structures may have been. A surface scatter of plain gray ceramics suggests a Basketmaker III or early Puebloan occupation for that site. Lack of the impressive stone tool assemblage found on 42Ka2584, as well as storage facilities, led Thompson to speculate that the 42Ka2662 habitation functioned as a field house. Charred macrofossils included one *Zea mays* cob fragment and a single *Chenopodium* sp. fragment. (See Appendix D).

**42Ws920 Mixmaster
(SUU field school, R. Thompson feature notes)**

This large and extremely complex “pueblo” was completely excavated by the Southern Utah University field school during the 1987 - 1988 seasons. Mixmaster is located on Little Creek Mt. at an elevation of about 5,600 feet. Richard Thompson named this site as a result of the frustrating lack of congruity between temporally diagnostic architectural forms and expected ceramic types. The initial assessment of the site was that it represented a typical “C” shaped, late Pueblo II roomblock. Excavation demonstrated that it had significant occupation during the BM III, PI, Early Pueblo II, and Late PII periods. Appendix A provides 5 dates for the site that illustrate well the difficulty of radiocarbon dating charcoal on structurally complex Virgin sites.

The site layout during its final period of occupation appears to be one of adjoining household suites and a benched Pueblo I pithouse that had been remodeled into masonry “kiva.” The redware count was very high (17% of total) with sand tempered types (cf. Shinarump Red Ware making up the vast majority (David Van Alfen personal communication 2014).

**42Ws881
(SUU field school, R. Thompson feature notes)**

This Southern Utah University field school site was fully excavated in 1989. It is located on Little Creek Mountain at an elevation of about 5,400 feet.

Excavation defined a Pueblo II roomblock with a significant underlying Basketmaker III component (investigated post FS). A single radiocarbon date taken from charcoal on the Pueblo II component yielded a conventional age of 870 $\pm$ 70 B.P., a calibrated 2 sigma range of A.D.1020-1285 with a calibrated midpoint of A.D.1195.

**AZ B:1:102 Corn Grower, SUU Field School
(Walling-Frank N.D.)**

This large pueblo lies on Public Lands and was initially tested in response to a request by Colorado City to acquire the land. Trenching demonstrated the site consisted of multiple roomblocks and a deep pitstructure. Subsequently, the Southern Utah University archaeological field school, under the direction of Dr. Richard Thompson and Barbara Walling-Frank, continued its excavation for the field seasons 1990-1995.

Eventually the site was dubbed Corn Grower, because of an abundance of evidence for the practice of maize agriculture. The site lies along Short Creek, a spring-fed perennial stream, at an elevation of about 5,000 feet. The site was completely excavated between in 1989 and 1995. The final layout is deceptive. While it appears to be a nearly enclosed plaza, the linear roomblock segments that form it were constructed separately and over a considerable span of time (Walling-Frank personal communication 1998).

Walling-Frank considers the roomblock on the northeast to have been constructed during Early PII times, along with the westernmost two rooms (#23, 28) in the north roomblock (Figure 94). Walling-Frank believes that it is possible that the EPII roomblock was abandoned and / or refurbished during the site's main occupation. It appears then, that the initial configuration may have been an east oriented “L” shape consisting of 2 or 3 residential rooms (#7, 8, 19) joined at a right angle to the masonry block of storage rooms (1-6). Two roomblock segments on the south were added at some point leaving an opening on the southeast.

Presumably the ‘kiva’ was constructed at about the same time as the “L” shaped roomblock (Figure 95). Over 5 meters in diameter, it is both larger and deeper than the Cottonwood pit structures. Like the Cottonwood sites, posts incorporated into the wall appear to have supported the roof

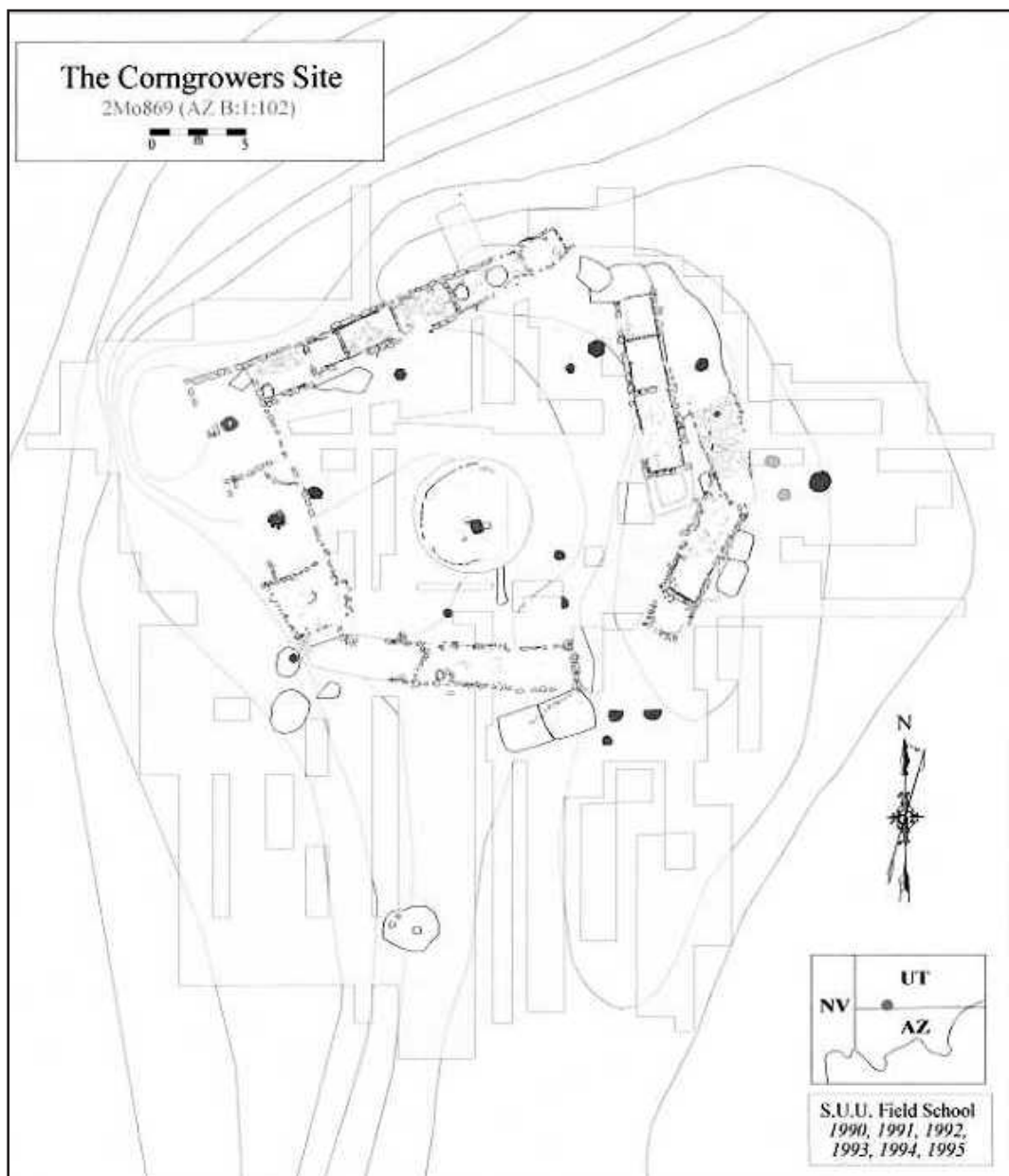


Figure 94. AZ B:1:102, the Corn Grower Site. Drawn by D. Van Alfen, provided courtesy of Barbara Walling-Frank, SUU Archeological Field School.



Figure 95. Corn Grower's view of kiva to north, note post molds, stacked masonry, and slab "baseboards."

beams. It is lined with upright slabs backed with "stacked" masonry rather than bonded - perhaps to accommodate the posts. The entire wall surface was plastered. The hearth is slab-lined and did not have a deflector. Floor features included two sealed sand-filled pits similar to those common in early pithouses (personal communication Barbara Walling-Frank 2014).

Six juniper tree-ring specimens from the vent-shaft were submitted for tree-ring analysis by the BLM Kanab Field Office resulting in two dates: a non-cutting date of 1096vv and a 1148++v date that is subjectively believed to be within a very few years of being a cutting date. This date is among the latest tree-ring dates reported for the Virgin culture area.

Trash in the kiva fill indicated that the structure was abandoned while the site was still in use. The high frequency of Shinarump Red Ware (100%, n=16) and the absence of Tsegi Orange Wares in the fill, suggests that occupation of the site continued into the Pueblo III times (see Appendix D, Table 7).

42Ka1813 Flood Canyon Pueblo

Flood Canyon Pueblo is included here because its layout bears a remarkable resemblance to both Corn Grower along the banks of Short Creek and Structure A at Coombs Village (Lister 1959) - both of which have produced tree-ring dates around A.D.

1150 or later (Table 38). Although Flood Canyon Pueblo has not been dated, it has been carefully mapped and measured (Figure 96).

The site plan clearly shows three large residential rooms, each about 5 meters square, oriented southwest-northeast. Extending off the southwest corner is a very substantial alignment of coursed masonry and rubble that defines a leg of rooms averaging 2 or 3 meters wide and 15m long.

Construction of this portion of the pueblo appears to be built as a "unit." Up to three or four courses of well-dressed, elongated sandstone form continuous alignments that suggest the structure was built during a single construction episode. Additional legs, constructed of different materials and using different construction techniques, form a square plaza of nearly continuous rubble. The area within this enclosure is undisturbed and although it has indications of a few additional rooms, it is largely clear with the exception of a depression approximately 5 meters in diameter.

The midden at Flood Canyon is disturbed and appears to be deep and substantial. Ceramics are abundant and indicate a Late Pueblo II occupation. Trade wares are not particularly obvious and the majority of types seem to be Shinarump grays, whites and redwares. No earlier types were noted on the site although the area was densely occupied and Early PII sites are located nearby.

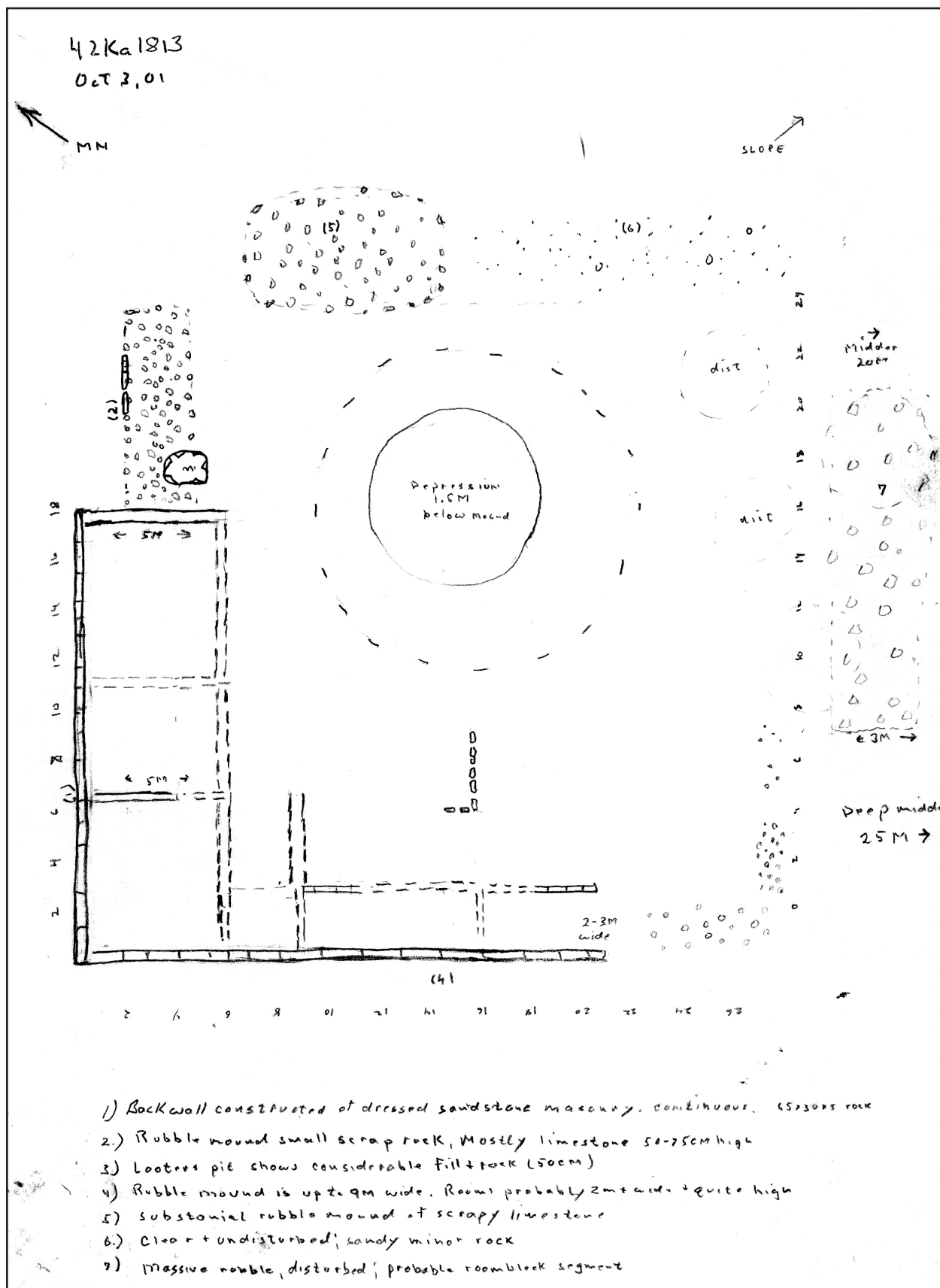


Figure 96. 42Ka1813 plan map.

No absolute dates are available for 42Ka1813. Relative dates are based on the proposed initial “L” shaped roomblock layout could date to the early A.D. 1100’s. A substantial post A.D. 1150 occupation is suggested based on IMACS site form estimates of an elevated frequency of Shinarump Red Ware over Tsegi Orange Ware (see Appendix D). Supporting a lengthy occupation extending into PIII times are additional roomblocks that form a plaza layout.

AZ B:4:57 (BLM) West Bench Pueblo

Although located in Arizona, the physiographic setting of this site is essentially part of Stokes (1986) Grand Staircase Subdivision. The “L” shaped layout (Figure 97) of West Bench Pueblo is very similar to other sites in House Rock Valley (McFadden 2004) and has much in common with both the Flood Canyon and Corngrowers sites previously described. The basic layout has additions that suggest a complex construction history. There is also good evidence of superpositioning of architecture. The site lies on the extreme west end of the Paria Plateau overlooking the upper end of House Rock Valley near its low divide with Coyote Valley. Alluvial cut and fill investigations in nearby Coyote Wash by Richard Hereford (Personal communication 2009) indicate that the valley was down-cut during the period A.D. 1150-1220. West Bench Pueblo’s location at the upper end of House Rock Valley near its divide with Coyote Wash may reflect an attempt to avoid a similar headward entrenchment event in that drainage.

West Bench Pueblo was initially recorded by MNA during their investigations (Mueller 1974). Although no absolute dates are available for the site it is included here to report on testing of the roomblock (McFadden 2008). Roomblocks and a wall appear to fully enclose a courtyard with central depression (Figure 95). Testing in the severely looted roomblock revealed underlying wall-fall, indicating an earlier occupation/construction event. The masonry roomblock walls, while initially appearing to be “ladder-construction” (Cameron 1999) were apparently constructed, or rebuilt, as

individual rooms (Figure 98). This accretional method of construction seems to be a comment on conformity to a linear style rather than a result of a single construction effort. Rooms floors were in poor condition but most, if not all, were paved with slabs. An alignment of two or three room outlines forming a right angle with the masonry roomblock, are similar in size, location, and construction to the residential rooms at Corngrowers. They also have a remarkable similarity with the Coombs site Structure A (see Figure 160). An additional roomblock segment was exposed on the south that suggests that a subsequent storage/residence unit was added after the “L” shape was constructed. To the east an alignment of rock forms a wall that fully encloses the pueblo creating a courtyard with a central depression.

Discussion

No chronometric dates are available for the site. Similar “L” shaped layouts units occur in House Rock Valley at Pleasant Valley Outlet with ceramic assemblages thought to date A.D. 1100-1150. The encircling additions suggest the occupation may have extended well into Pueblo III times.

The linear roomblocks on this site, as well as its overall plaza layout, suggests a departure from the traditional view of Virgin architecture. Superpositioning of the roomblock over earlier wall-fall and the accretional growth of the pueblo indicate a lengthy and complex construction history - a common Virgin trait. Since the occupation of this area prior to Late Pueblo II times is generally considered Virgin, it may be argued that the linear expression of late PII architecture at West Bench Pueblo is little more than stylistic.

A review of the ceramics collected by the Museum of Northern Arizona in the 1960’s, in light of more recent ceramic definitions for the Shinarump, Virgin, and Kayentan series pottery, was an initial step towards defining the cultural identity for West Bench Pueblo. Determining the frequencies of Tsegi Orange Ware types and their ratio with the newly defined Shinarump Redware (Allison 2007) would address both cultural affiliation and temporal placement for West Bench Pueblo.

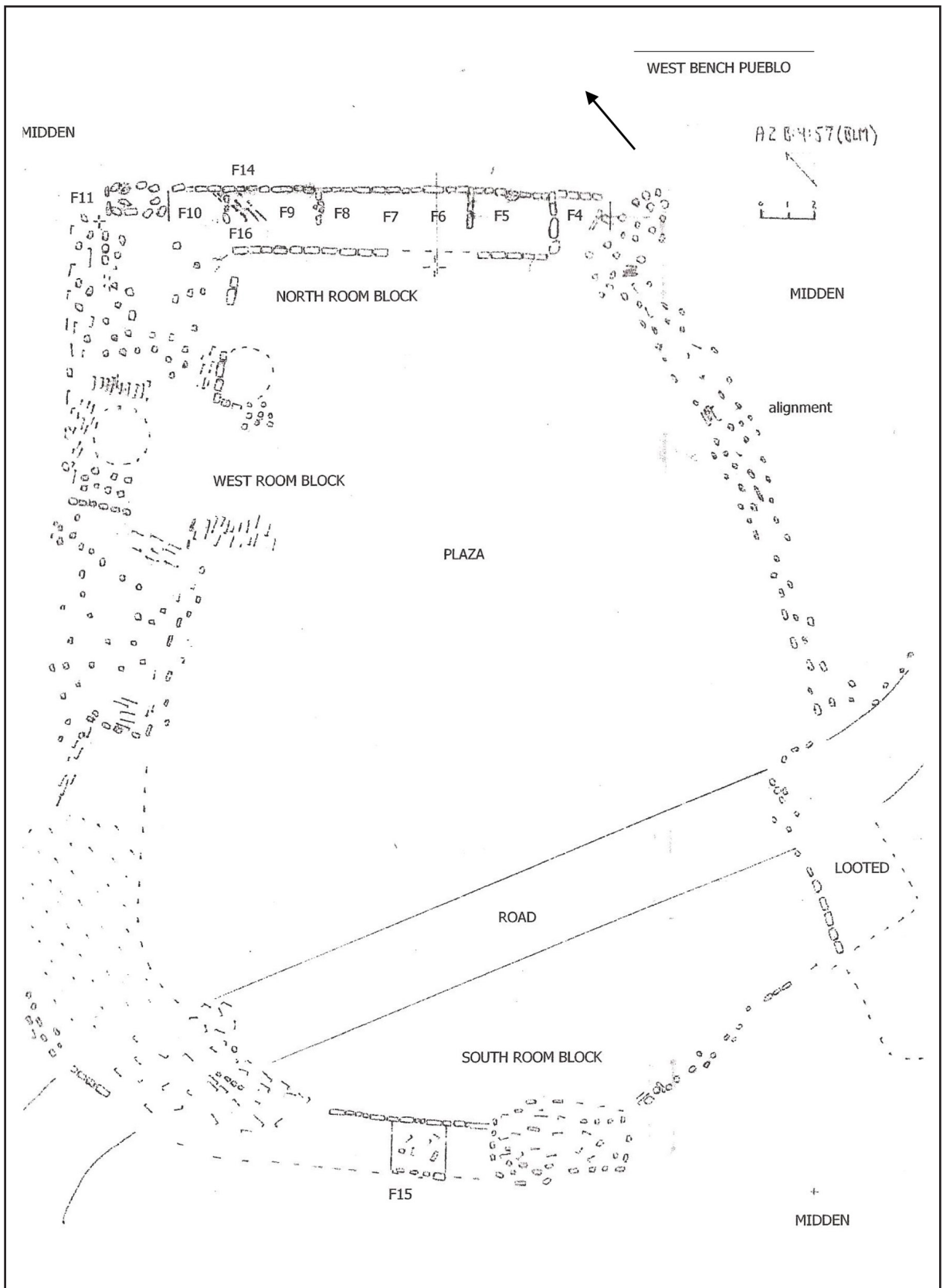


Figure 97. AZ B:4:57 (BLM) West Bench Pueblo site plan.

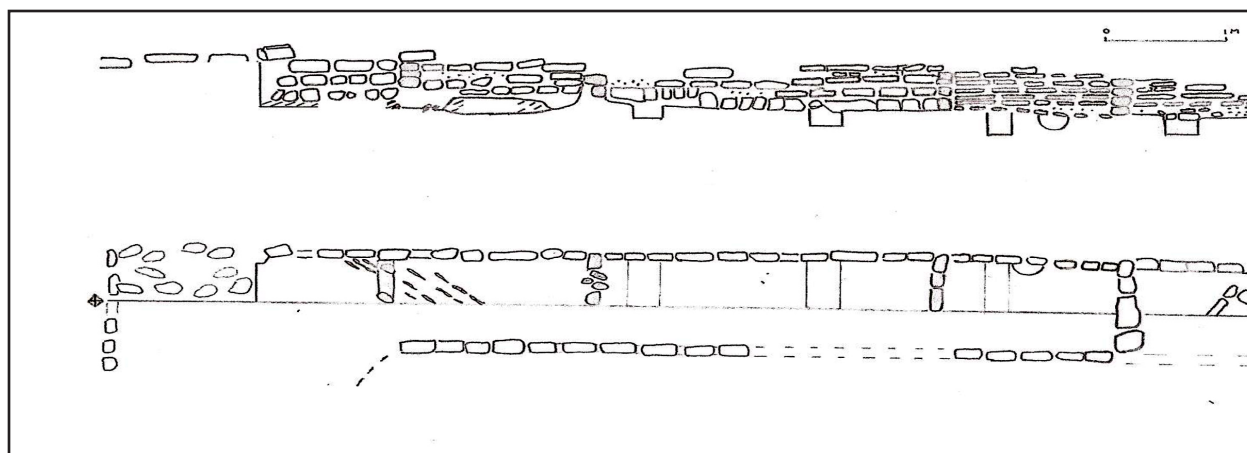


Figure 98. AZ B:4:57 (BLM) West Bench Pueblo roomblock profile and plan.

PUEBLO III SITE DESCRIPTIONS

GC-671 (Thompson and Thompson 1974)

These late dates were reported by Thompson from the Tuweep area on the north side of the Grand Canyon (Table 13). Field notes are available at Southern Utah University. The dates are included here because they were the first radiocarbon dates to suggest that the Virgin sequence of occupation might extend into the thirteen century. The dates were accepted at face value by Thompson but were considered improbable by most researchers until recently.

42Ka3694 Hog Canyon Shelter

Located above a spring-fed riparian tributary to Kanab Creek at approximately 5,700 feet, this south aspect sheltered site is well situated to exploit both upland dryfarm settings as well as canyon bottom agricultural opportunities. The architecture exposed at present consists of a small roomblock with two well-preserved masonry rooms and evidence for a third (Figure 99).

Rooms 1 (200cm x 190cm) and 2 (250cm x 160cm) are similar in size and construction. The floor area of Room 1 is 3.8 sq. meters; Room 2 is 4.0 sq meters. Masonry is coursed with selected and in some cases dressed rock heavily mortared with orange clay, and generally plastered (Figure 101). Stick and pole impressed adobe scattered on the surface suggest an adobe roof. Each room

has entries 50cm wide with slab thresholds visible near the modern ground level. An east-west wall segment, 70cm long, paralleling the back wall of the shelter, abutts the west wall of Room 2. Removal of the sandy fill in this niche-like area, visible during the initial recording in 2000, has revealed one meter of buried masonry exposing an overall wall height of at least 150cm for the west room (Figure 100). This indicates the entryway sills are about one meter above the probable occupation surface, a height similar to the storage rooms at Judd's Cave 3 and 6. Beam sockets near the top of the east room reinforce the impression that the walls for both rooms are very near their original height. Given a 1.5 meter ceiling height the volume of Room 1 is 5.7 cubic meters and 6 cubic meters for Room 2 - or a little less given the slope of the alcove wall. These volumes are comparable to other masonry storage units during late PII/ PIII times (Table 28).

Although the two rooms are nearly identical in form, the east room was constructed first and the west room was butted up against it. The buried wall forming the niche abutts the west room indicating a sequence of construction from east to west. It seems likely that the purpose of the wall segment was to form a room on the south rather than form a small enclosure behind it. Soot blackening at the rear of the shelter extends from the east side of Room 1 west to a point about 6m beyond Room 2. It is possible that the scatter of rock and large chunks of adobe, some stick impressed, could be part of a large dwelling similar to Judd's Cave 6, Room 12.

Laboratory Number	Date (B.P.)	Date A.D.
RL78	630+/-100	A.D. 1320
RL50	720+/-100	A.D. 1230
RL79	780+/-100	A.D. 1170
RL80	840+/-110	A.D. 1110

Table 13. Radiocarbon Dates From Grand Canyon-671 (Thompson 1974), reported in Berry 1982).

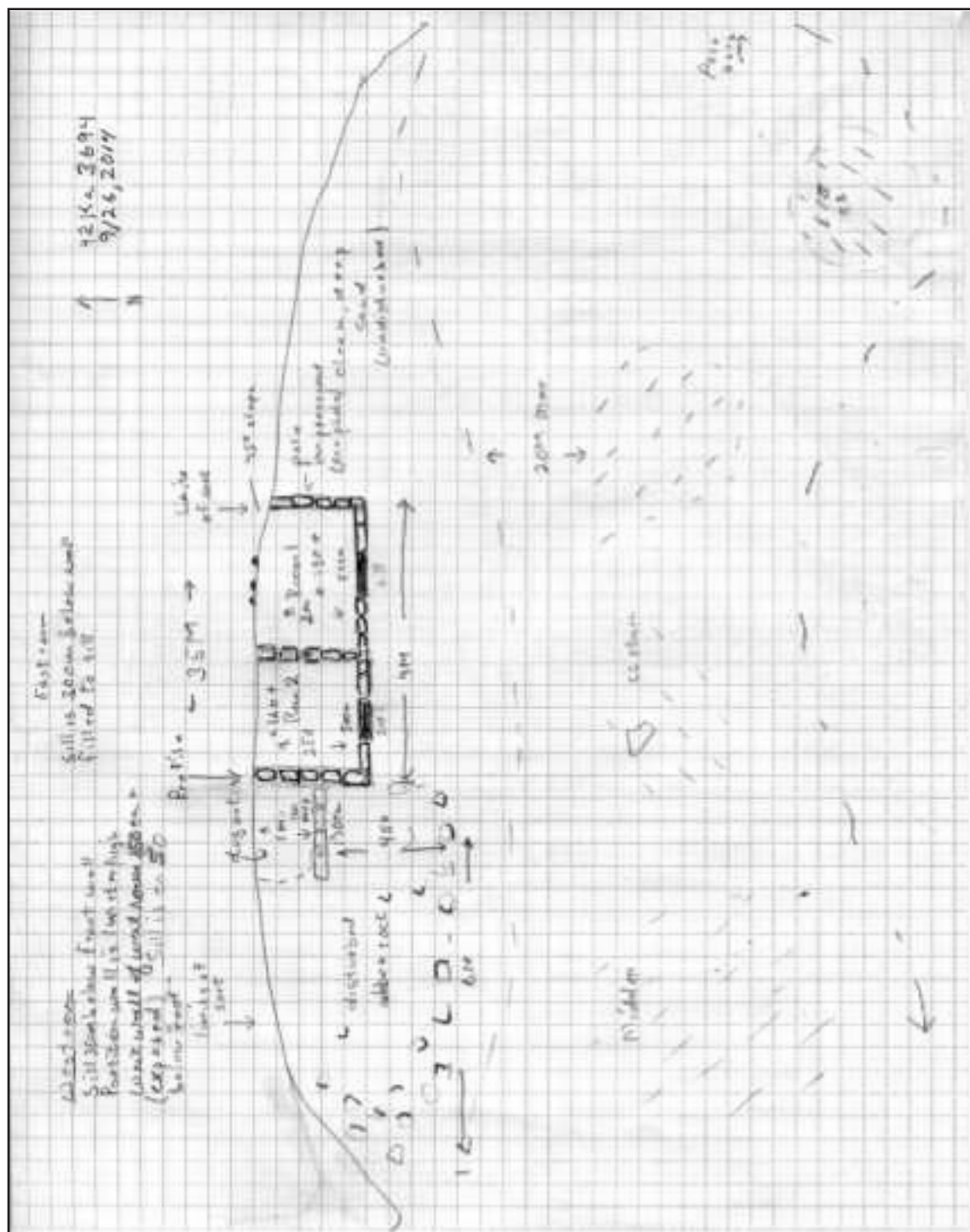


Figure 99. 42Ka3694, plan map.

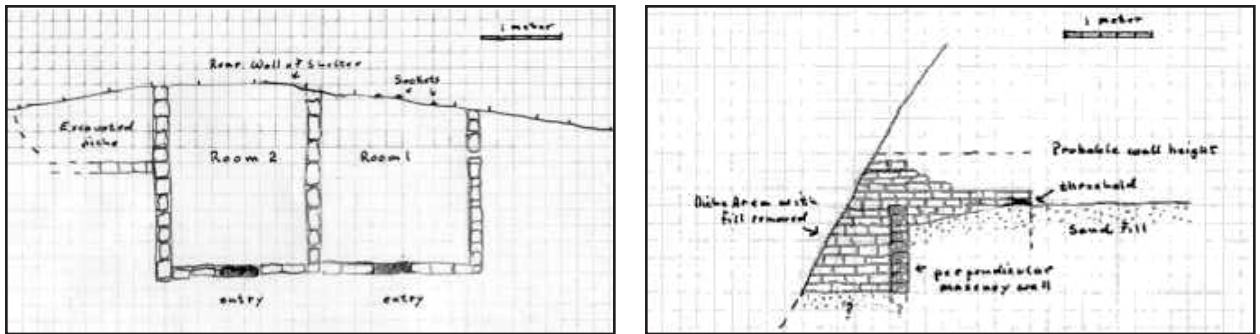


Figure 100. 42Ka3694. Left: detail of Rooms 1 and 2 with perpendicular wall. Right: Profile of west wall, Room 2.

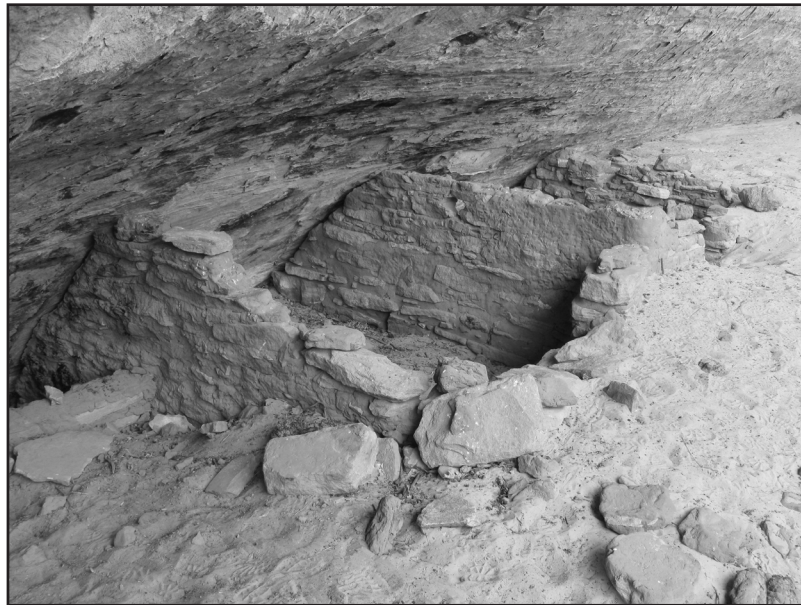


Figure 101. 42Ka3694, view of roomblock to east.

Jacal fragments on the surface include some burned daub, possibly from an earlier occupation and a large chunk of unburned orange adobe with pole impressions. This latter chunk, flattened on the back and on one side, is assumed to have been part of the roof for either the east or west rooms. A few small twigs in the matrix yielded an intercept age of Cal. A.D. 1260 and a 1 sigma calibrated date of Cal. A.D. 1200-1290; 2 sigma results were Cal A.D. 1060 - 1080 and A.D. 1150-1300 (Beta-163063). As on many sites of this period, the traditional radiocarbon date calibrated results are not very precise.

Ceramics observed on the surface during the initial recording included BMIII/PI, Early PII, and Late PII jar rims suggesting the shelter had a long history of occupation. Four separate areas of midden deposits on the south have good examples of Early Pueblo II style everted jar rims, both Shinarump

and North Creek Series. Many of the sherds on site are "classic" vitrified Shinarump with several having Tusayan Corrugated style patterns (North Creek Corrugated). Exotic White wares include a Kayenta Series Sosi Black-on-White and a Dogoszhi Black-on-White sherd. Several unidentified Virgin white wares (generally broadlined) were documented along with one a sherd displaying a Lino design element. No redwares were observed on site. Although the middens don't segregate temporally, abundant ground stone, hammerstones, a few chert lithics, and dressed slab fragments suggest habitation function, as well as storage, for the site.

Ceramics indicate use of the site in BMIII, PI, and Early PII times in addition to the most obvious Late PII occupation. It is tempting to speculate on the possible temporal association of both Early PII and Late PII ceramics, but without excavation whether they are contemporary or not is

purely speculative. Future investigations, including exposure of the buried architecture and additional dating, could demonstrate the site's final occupation was contemporary with those in Cottonwood Canyon dating to about A.D. 1100 rather than post dating A.D. 1150 as the radiocarbon date suggests. Certainly Late PII sites are located in similar well-watered, sheltered settings.

42Ka1568 Pottery Knoll (University of California, Long Beach)

This large, architecturally complex pueblo is located at the confluence of Deer Springs and Park Wash which converge to form Kitchen Corral Wash, a tributary to the Paria River. The site was the primary focus of the University of California, Long Beach field school from 1989 to 1991. Although excavation at the site was limited to clearing two rooms, limited trenching and remote sensing explorations, the investigations resulted in four Masters theses; Morley 1993; Valdes 1993; Dohr 1994, and Silva 1999). Neutron activation analysis of various ceramic types and wares on site suggested

that pottery clay was obtained from both local and nonlocal sources (Neff, Larson, and Glascock 1997). Larson represents 42Ka1568 as a sizeable population aggregation occupied during Pueblo III times (Neff, Larson, and Glascock 1997).

Morley (1993) provides an approximate site plan map showing excavated rooms and test units (Figure 102). The site layout is described as consisting of two plaza units: a nearly enclosed "C" shape series of rooms on the west, and an "L" shaped unit on the east with a partitioning wall defined by Trench 4 in the middle. Overall, the site measures 42m x 40m. In all, 57 rooms are portrayed around the plazas divided by a masonry wall. A magnetometry study identified a probable "kiva" within the western plaza.

Clearly the construction history of 42Ka1568 is complex and requires additional excavation to sort out. Based almost entirely on surface observations, often disturbed, the plan map is only approximate. The best defined plaza and courtyard layouts with similar ceramic assemblages occur on the Paria Plateau some 30 miles to the southeast, although good examples also occur nearby on the Grand

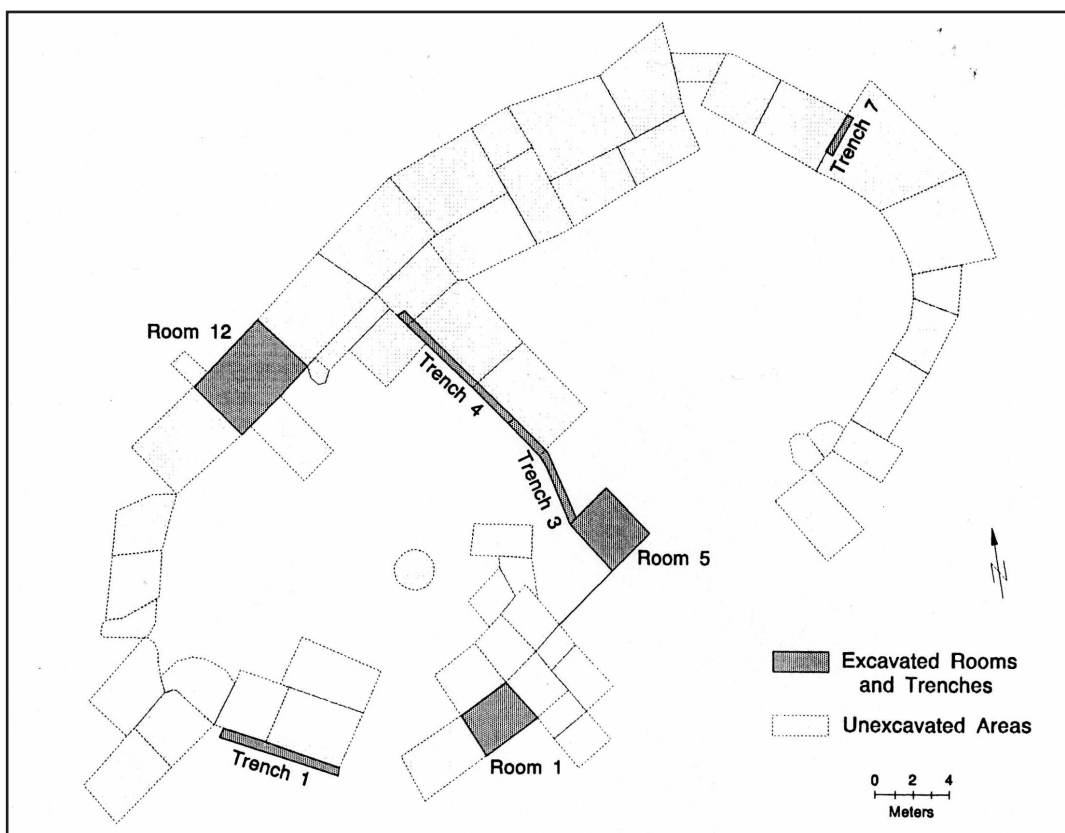


Figure 102. 42Ka1568, plan map (after Morley 1993).

Staircase (see Figure 96). A comparative analysis of existing layouts with various configuration options on 42Ka1568 analysis might provide additional insight into its construction history.

Depending on actual room size, and their relationships to one another, various configurations can be proposed for 42Ka1568. Room size and wall construction detail offers a method of defining household suites consisting of both residential and storage rooms (see Lyneis 1986). Three rooms were partially excavated providing data on room size and function (Table 14). Based on size and interior features of the excavated rooms it appears that out of a total room count estimate of 50, about 10 are residential and some 40 or more small; a storage-to-residence ratio similar to plaza pueblos located on the Paria Plateau (Figure 125) or, the equivalent of three or four courtyard pueblos (Figure 121).

Storage capacity

Room 1 has a capacity similar to most storage units (assuming a ceiling height of one meter). Both charred beans and maize were recovered from the slab paved floor of the structure. If maize was shelled before it was stored, the capacity of Room 1 would have sufficed for a small family; if stored on-the-cob less so, but still a considerable amount. If the ceiling height was doubled, so too would its capacity. The question of Pueblo III storage technology, i.e. the storage room as vessel or shelled maize in ceramic vessels, remains an open question. The slab floor in Room 1 suggests a continuation of the Virgin storage technology of storing produce in sealed granaries rather than in ceramic vessels - whether shelled or not. If stored in 7 liter vessels, a floor area of 12 sq meters would have been required for a metric ton (Wilshusen1986). Assuming the vessels were not stacked, 3 such rooms would have been necessary for the same amount of maize (Table 14).

Dating

A total of five radiocarbon dates were run at Pottery Knoll. Two of the five radiocarbon dates obtained from the site fall into the late 12th and early 13th centuries: a date taken on maize from Room 1 yielded a 2 sigma range of A.D. 1195-1300 (Beta-55077); a charcoal sample from "roof mat" dated A.D. 1175-1295 (Beta-55078). The other three dates could be a little earlier but can be interpreted as supporting a late PII/PIII occupation (Appendix A).

Ceramics

A total of 2,627 sherds were collected on site, nearly all from the surface (Morley1993:147). Grayware constituted just over 80% of the total collection with plain and corrugated types occurring in equal amounts - a frequency that suggests an earlier, undetected, occupation (the Arroyo and Gnatmare sites both had 86% corrugated). Ceramics were not typed by traditional classification methods but instead by descriptive categories of plain, corrugated, Black-on-White, painted Black-on-White, and red. This method was of little use for cross-dating, establishing cultural affiliation, or assessing the intensity of external relationships. It may have contributed to the description of Pueblo III types being present on site (Neff, et al. 1997: 477). No Pueblo III types have been confirmed from the site.

The question of the presence or absence of Pueblo III ceramic types north of the Colorado River is a relevant one. As the growing number of radiocarbon dates demonstrate occupation during Pueblo III times, the near total lack of Pueblo III ceramics in the cultural area suggest that there are limits to relying on the presence/absence of cross-dated types in the Virgin region. The Arroyo site, located 2 kilometers downstream, also dated to

Feature	Size	Area	Interior features	Function
Room 1	2.77 x 1.69	4.68 sq meters	Slab floor, charred maize & beans	storage
Room 5	1.72 x 1.40	2.41 sq meters	None observed	storage?
Room 12	3.05 x 4.00	12.3 sq meters	Hearth, clay floor, mealing bin bench	residential

Table 14. 42Ka1568, Pottery Knoll room dimensions (after Morley 1993).

Pueblo III times yet, a thorough analysis of over 13,000 sherds revealed no diagnostic Pueblo III types. (Perry 2012). It appears then that interaction between the Kayenta region and the Grand Staircase was virtually non-existent after A.D.1150.

A review of sherd collections from Room 12 supports the impression that Shinarump Red Ware frequencies increase during the Pueblo III period at the expense of Tsegi Orange Ware which appears to become rare after about A.D. 1150 (see Appendix D). Morley reports sixty-two red ware sherds were collected from the surface sample (Morley 1993:179). Typing these sherds should indicate the intensity of Kayenta contact both prior to and during the Pueblo III period.

42Ka3976 Arroyo Site

This late PII-PIII farmstead is located along Kitchen Corral Wash two km south of Pottery Knoll. The Arroyo site lies on alluvial deposits at the base of a colluvium covered bench at an elevation of 5,560 feet. The site was completely buried in the alluvium until recently exposed in profile by an erosional cut several meters deep (Figures 103, 104). The cutting event bisected the roomblock exposing both a storage room and a residential room. It also sectioned two subterranean pitstructures, exposed three “mini” pithouses, a burial, and 40 meters of stratified deposits and occupation surfaces. This natural excavation unit was seized upon as an opportunity to sample these features under excellent vertical and horizontal control. An underlying Archaic component is described under in the Archaic-Transitional section of this report.

Notwithstanding two early dates, presumably the result of “old wood”, the Puebloan component of the Arroyo site was occupied during late Pueblo II - Pueblo III times (Table 15). Occupation of the site appears to have been by a family or two. The site’s construction history is viewed as typically Virgin - that is, the pattern involved reflooring the storage room, reoccupation of the roomblock residence as evidenced by superpositioned hearths, and use of the excavated pithouses as midden dumps. The intensity and domestic nature of the occupation was evidenced by large quantities of all classes of artifacts including groundstone, numerous worked ceramic disks, bone tools, and a diverse chipped stone tool assemblage.

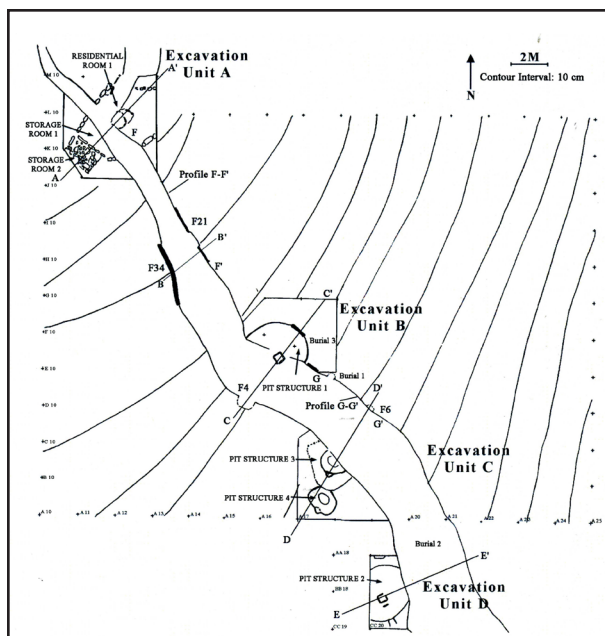


Figure 103. 42Ka3976, plan map of the Arroyo site.

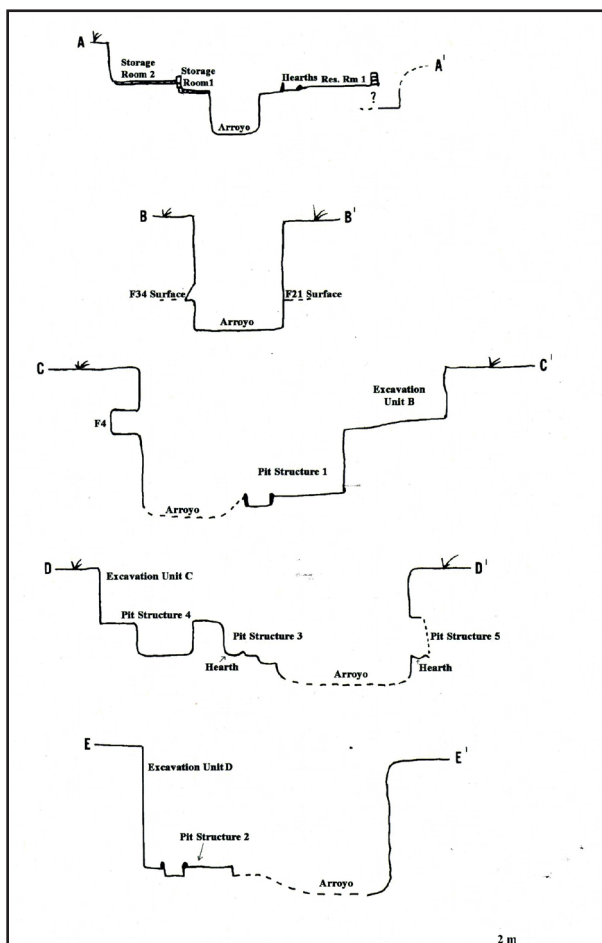


Figure 104. 42Ka3976, cross-sections.

Laboratory Number	Prov.	C 13/12 Ratio	C14 Age	2 Sigma Range	Cal. Midpoint	Material
Beta 77117	F9	-25.0	820+/-60	AD 1045-1105 1115-1290	AD 1235	Charcoal
Beta 77111	F11	-25.0	1150+/-70	AD 705-1020	AD 890	Charcoal
Beta 77114	F32	-25.0	1110+/-70	AD 780-1035	AD 970	Charcoal
Beta 77113	F3	-25.0	1020+/-50	AD 960-1065 1075-1155	AD 1015	Charcoal
Beta 66334	F14 Hearth	-25.0	1020+/-50	AD 960-1065 1075-1155	AD 1015	Charcoal
Beta 77115	F10	-25.0	700+/-50	AD 1250-1395	AD 1290	Charcoal
Beta 77116	F20	-25.0	840+/-50	AD 1045-1105 1115-1280	AD 1220	Charcoal
Beta 77112	F40	-25.0	760+/-60	AD 1180-1310 1365-1375	AD 1275	Charcoal
Beta 100262	F3 fill	-13.7	870+/-80	AD 1010-1290	AD 1195	Corn cob
Beta 77110	F7	-25.0	950+/-60	AD 990-1225	AD 1040	Charcoal
Beta 66335	F7 surface	-25.0	860+/-50	AD 1035-1275	AD 1205	Charcoal
Beta 117941	F11 Hearth	-9.2	850+/-30	AD 1165-1260	AD 1215	Corn Kernel
Beta 117940	F14 (F3 hearth)	-10.0	800+/-30	AD 1205-1280	AD 1250	Corn Kernel

Table 15. Radiocarbon dates from 42Ka3976.

The ceramic assemblage totaled over 13,000 sherds. Corrugated, whiteware and redware ceramics are abundant and are interpreted as locally made (Perry 1998). White ware design styles seem also to reflect this local variation. Most designs are local variations of Sosi and Dogoszhi styles (Figure 105). No Pueblo III pottery types were identified.

Small projectile points include a nearly equal mix of basal-notched styles (cf. Parowan basal-notched) as well as triangular Bull Creek types (Figure 106). In addition to agriculture, as evidenced by pollen, macrofloral remains, and stable carbon isotope analysis, faunal remains were abundant and well-preserved. Represented in order of abundance were big horn sheep, pronghorn, mule deer, and elk. Domestic dogs and probably turkey were represented in the faunal assemblage as well as a variety of small game (Nauta 2012).

The Arroyo Site is interpreted as an intensively, if intermittently, occupied farmstead during Late

Pueblo II/Pueblo III times. Subsistence was based on agriculture but was supplemented by abundant, locally available, big game (Table 27). The total absence of Pueblo III diagnostic ceramics is considered evidence for an absence of contact with Anasazi groups south of the Colorado River.

The presence of at least two fully subterranean pitstructures comment on their use during Pueblo III times for domestic purposes, as opposed to functioning as kivas. Two, possibly three, “mini pithouses” indicate that this structural type, found during Pueblo I as far west as the St. George Basin, persisted into Pueblo III times.

The Arroyo site remains an exceptional candidate for future investigations including non-destructive remote sensing techniques. The majority of the site remains sealed by alluvium. Four datum markers were placed to allow for reestablishment of the grid system.

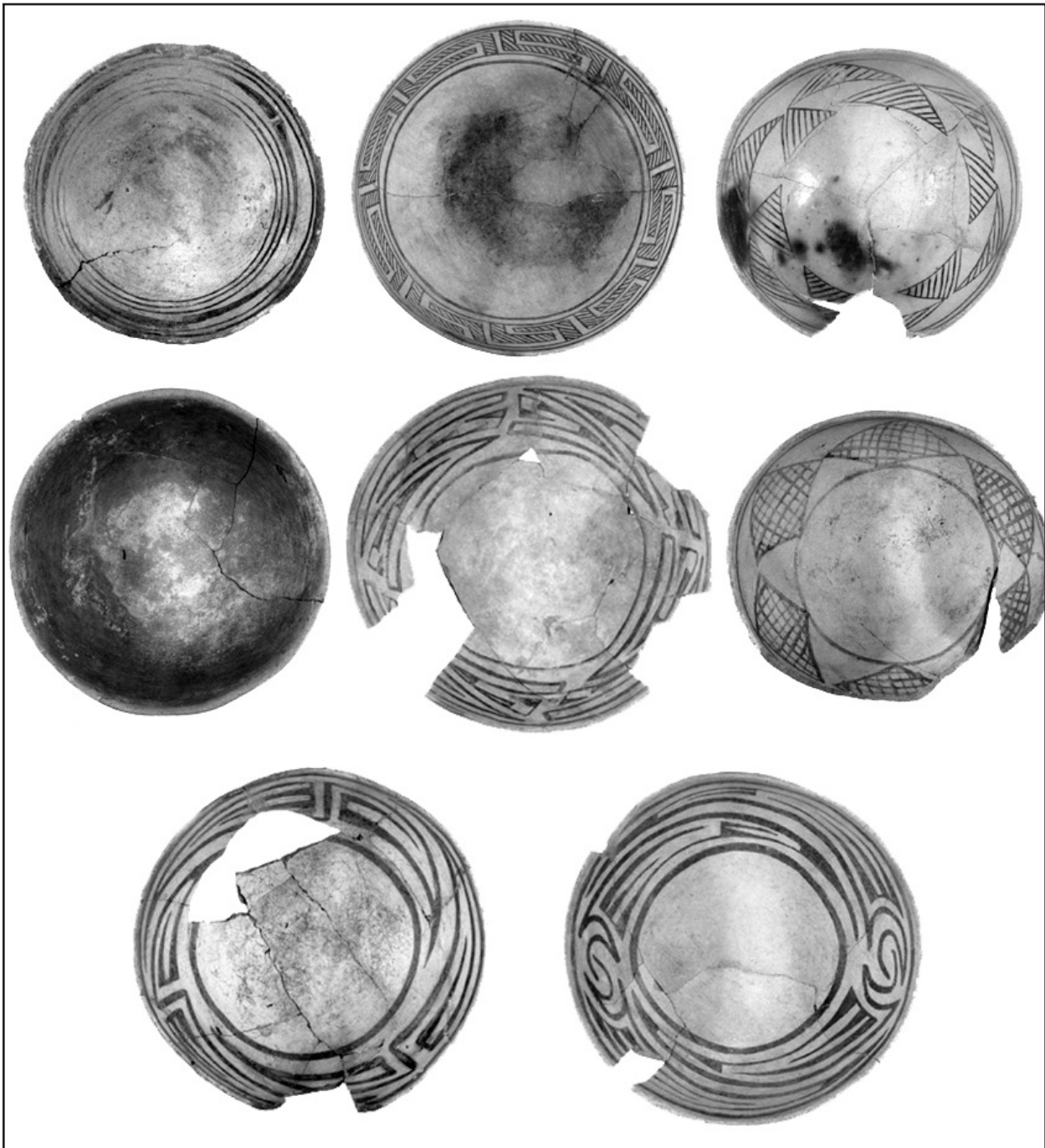


Figure 105. 42Ka3976, Late PII - PIII bowls.

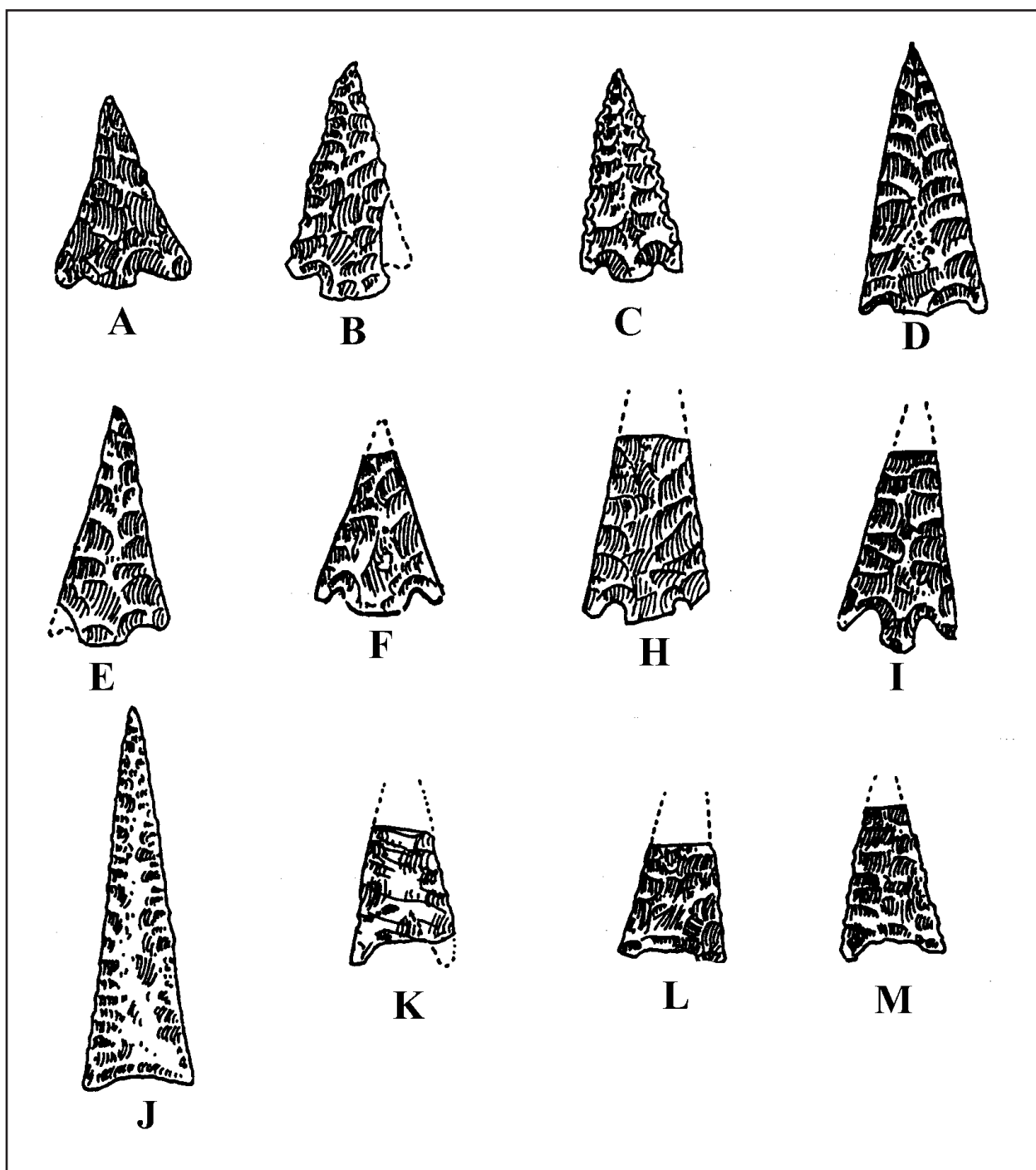


Figure 106. 42Ka3976, Arroyo site projectile points: Parowan Basal-notched points (a-i); Bull Creek points (j-m) (d is 3.5 cm).

42Ka1978 Gnatmare Site (Metcalf 1981)

The Gnatmare site is located on the extreme eastern edge of the Grand Staircase physiographic section at an elevation of 5,010 feet. It is situated about 10 meters above the floor of Cottonwood Canyon, a relatively narrow north-south corridor with a perennially flowing stream. Excavation of the site was carried out by the University of Utah as a mitigation project for a power line upgrade. This is a rather anomalous site in terms of its environmental setting, isolation from other residential sites, and architectural layout.

Gnatmare's site layout includes a large rectangular surface room (Structure I) with a clay coped hearth and a deep pitstructure (Structure II) located 6 meters to the southeast (Figure 107). The pitstructure showed evidence of having been abandoned and re-occupied. The lack of storage features on site is not typical of Virgin site layouts.

Charcoal from Structure I roof fall yielded a conventional radiocarbon date of 720+/-65 and 2-sigma results of A.D.1215-1400 (Uga-3749).

Roof fall from the latest occupation of the pithouse yielded a conventional date of 835+/- 65 B.P. and a calibrated date A.D.1035-1290 (Uga-4003). The hearth associated with the second occupation yielded a B.P. date of 980+/-75 and a 2 sigma range of A.D. 905-920, A.D. 950-1225 (Uga-3751). It is possible that any or all of the dates are too early as a result of "old wood" used in construction or as fuel however they are consistent and congruent with the artifact assemblage.

The ceramic assemblage, while not typical of Pueblo III times south of the Colorado River, is similar to that found on other sites on the Grand Staircase with thirteenth century radiocarbon dates. Supporting the Pueblo III assignment is the presence of 14 sherds of Nankoweap Polychrome found scattered throughout the site (see Appendix C).

The sole diagnostic projectile point type found on Gnatmare was the Bull Creek style. Nine points of this type were found in Structure 1, the pithouse fill, and other areas of excavation. While this type is common in late Virgin contexts it is rarely the dominant type.

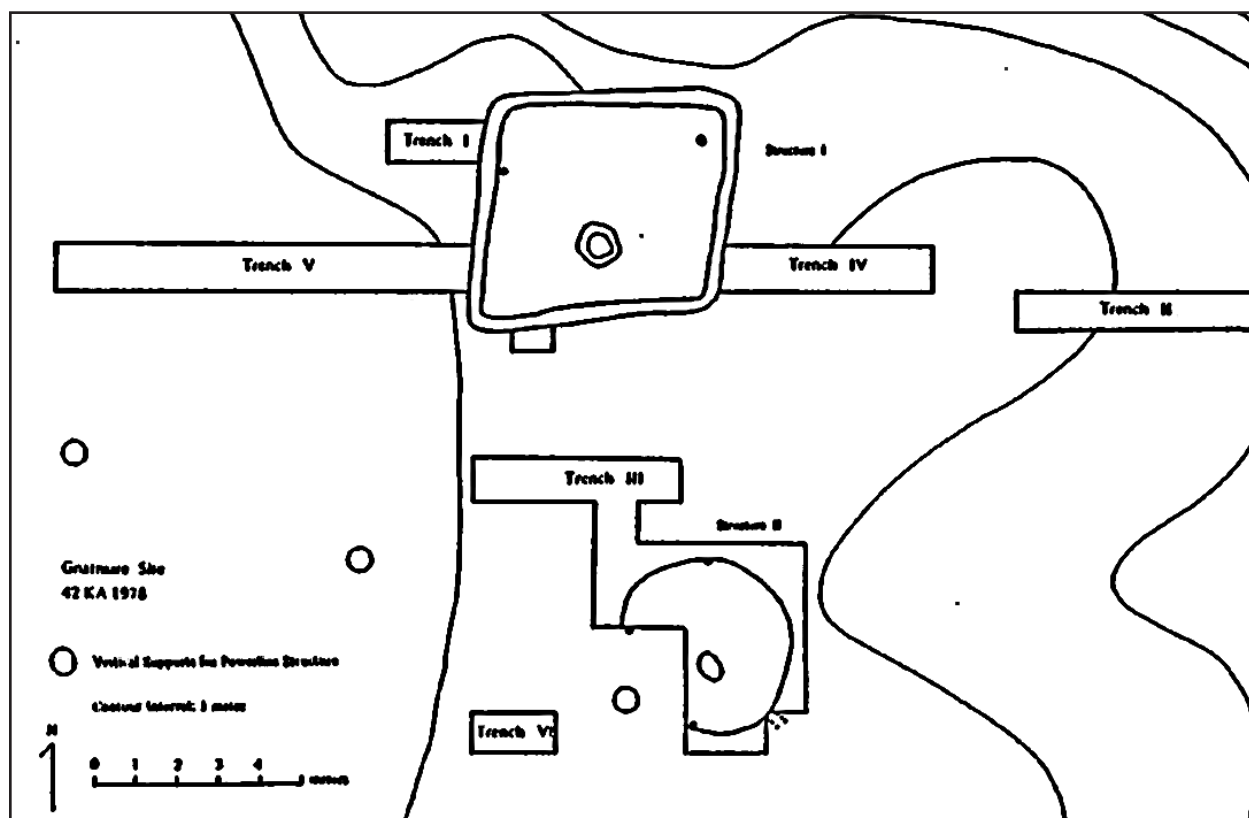


Figure 107. 42Ka1978, Gnatmare site plan (after Metcalf 1981).

Gnatmare appears to be an anomalous site type. The artifact assemblage has affinities to both Virgin and Kayenta traditions while the architectural layout is not typical of Virgin household units on the Grand Staircase. In terms of size, shape, and function, the surface room has more in common with architecture found on Fiftymile Mountain.(cf. Mudholes Pueblo).

42Ka3332

This site was recorded as a single-room storage structure associated with a minor stain and artifact scatter. The structure was looted just prior to being recorded as part of the Seaman Wash Inventory in 1988 (McFadden1996). It is located on a broad, arable, pediment slope extending out from the base of the Vermilion Cliffs at an elevation of 5,700 feet. Although looters had removed most of the structures fill, remaining spoil was cleared and the structure was mapped (Figure 108).

The lower courses of the rooms walls were constructed of unshaped local sandstone. Relatively large, the interior measured 3.6 meters x 1.4 meters with remaining masonry walls 40 cm. high. There was no evidence of an interior partition nor were there any “baseboard” slabs lining the interior as is common in early Pueblo II storage rooms. No

attempt had been made at bonding the masonry; in several instances three and four rocks were simply stacked on one another. A rough estimate of wall height, based on the surrounding rubble, indicated that even with copious amounts of mortar, the walls would not have been much over a meter in height.

The floor was constructed of fist-sized cobbles and a few large flatter rocks laid directly on the red clay substratum. In a few places a well prepared but weathered clay surface covered the floor pavement.

Extramural investigations on site involved auger testing off each end of the room, as well as the area immediately southeast. Virtually no depth of deposit was encountered at these locations. The stained portion of the midden, which measured about six meters in diameter, lay some 14 meters and 130 degrees off the southeast corner of the room. This deposit yielded charcoal stained and flecked clay to a depth of 60cm. below the modern surface.

A second auger hole in the midden produced very fine ashy soil. It seems likely that this area holds a shallow pithouse or domicile of some sort although a test trench would be required to confirm or reject the possibility.

No absolute dates were obtained for this site. The ceramics should represent a good single component assemblage. Unusually high percentages of red

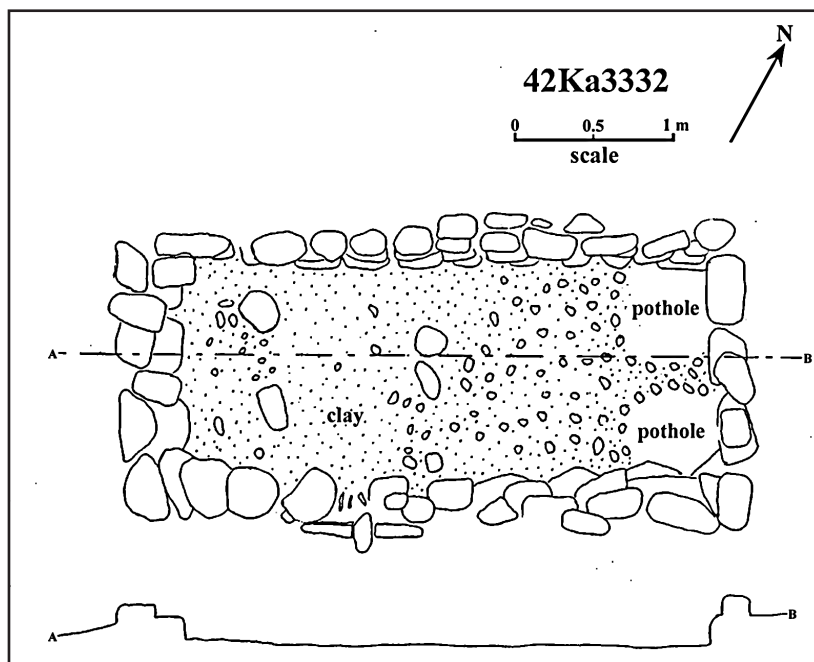


Figure 108. 42Ka3332, storage room.

ware and corrugated were noted. A grab sample was collected and is curated at Southern Utah University. Types identified in the field include: North Creek Corrugated (100-500), Shinarump Gray (1-9), North Creek Gray (10-25), "Dogoszhi" B/W (1-9), "Sosi" B/W (1-9), Tsegi Orange Ware (10-25) and Shinarump Red Ware (8).

42Ka3328

This site is located on an extensive alluvial fan near 42Ka3332 at an elevation of 5,560 feet. It consists of a linear 23 meter rubble mound oriented southwest-northeast with a 12 meter long leg projecting off the west end at right angles (Figure 109). Recorded in 1988 as part of the Seaman Wash Inventory (McFadden 1996), the linear configuration of the roomblock was considered a "Kayenta style." A looted portion of the roomblock was cleared and mapped revealing four accretionally constructed rooms. Rooms 1, 3, and 4 were paved and apparently functioned as storage rooms. Room 3 has a hearth and appears to be a residence. It is constructed of masonry and may have been

remodeled. Charcoal collected from the floor of room 1 yielded a conventional radiocarbon date of 810+/-60 B.P. with calibrated results (95% probability) of A.D.1055-1090, A.D.1150-1295 and a intercept date of A.D.1245 (Beta-40331). The construction sequence of the rooms at 42Ka3328 revealed that linear "Kayenta style" roomblocks on the Grand Staircase were not necessarily constructed as a unit; similar to curvilinear roomblocks, accretional construction and episodes of remodeling were apparent.

The majority of the ceramic assemblage was considered North Creek Corrugated (500+) and North Creek Gray (500+) with some classic Shinarump present as well including Virgin and Toquerville Black-on-White. Kayenta series Black Mesa and Sosi types were also identified. Both Tsegi Orange (25-100) and Shinarump (100-500) red wares were identified in the field. The inventory collection was reviewed in 2014 (see Appendix C). One Tsegi Orange Ware and 7 Shinarump Red Ware, including 3 Nankoweap Polychrome sherds, suggest the site was occupied post A.D. 1150.

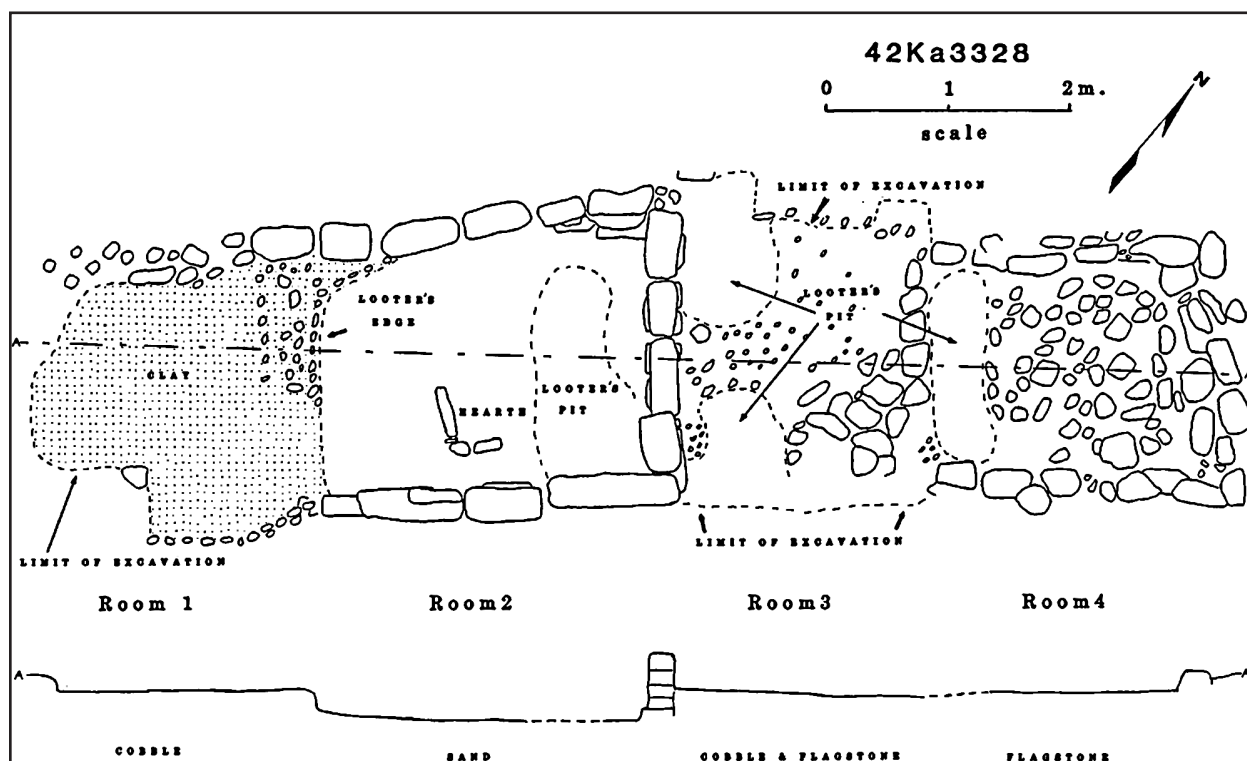


Figure 109. 42Ka3328, accretionally constructed roomblock segment.

AZ B:6:44 (ASM) The Pinenut Site
(Westfall 1987), also a review (Wilcox 1988).

This small farmstead is located on the Kanab Plateau near the head of Water Canyon, a tributary to Kanab Creek, at an elevation of 5,440 feet. Although the site is technically outside the study area it is reviewed here because it yielded a majority of Virgin and Shinarump ceramics. Its construction and layout is typical of sites on the Grand Staircase, and it provides good chronometric data for describing a late occupation. Thoroughly reported, it offers an opportunity to address the sites occupational history, chronology issues, seasonality, and subsistence behavior - all of which are regional concerns.

Pinenut consists of six accretionally constructed masonry rooms including one residence, a relatively shallow pithouse (with an encircling alignment), and two isolated cists (Feature 1). Westfall provides a comprehensive consideration of the sites chronology that proposes two occupational episodes that took place during two periods; A.D. 1050-1100 and A.D. 1200-1250/1275 (Table 16). Wilcox (1988) offers an alternative interpretation for the sequence of construction.

Given the latest episode of occupation during the 13th century, the absence of Pueblo III ceramics is notable but consistent with other late sites in the region. The total ceramic collection of 1,054 sherds

is small, but low ceramic counts are also consistent with most sites in the region. The assemblage is divided between the Virgin Series, a considerable amount of Shinarump Series types, and Moapa Wares from the nearby Mt. Trumbull area. Both Early PII (plain) and Late PII (corrugated) are well represented. Painted designs were relatively few in number and not particularly diagnostic. Exotic types were restricted to Tsegi Orange Ware.

Although the sample was small, red ware frequencies are congruent with the radiocarbon dates. Only 3 Tsegi Orange Ware sherds were recovered: 2 TOW from the site surface. and 1 Tusayan Black-on-Red from the pithouse fill. In contrast, 14 San Juan Red Ware (Shinarump Red Ware) were recovered from the roomblock. This supports the post A.D. 1150 dates for the roomblock. The F1 masonry roomblock storage rooms were paved with slabs, sealed with clay, and / or on bedrock- a typical Virgin method of securing storage rooms and one which is congruent with the general lack of pottery that could have been used to store seed. The radiocarbon dates cluster during Early Pueblo II but as Wilcox (1988:69) points out, late (PIII) dates come from both the pithouse and the surface habitation room - good evidence they were contemporary. It might be pointed out that the encircling alignment around the pithouse, which initially drew attention to it, is similar to outlines common in the Mt Trumbull area (McFadden

Laboratory Number	Feature Assoc.	C14 Date (B.P.)	"Date A.D."	Cal A.D.*
Kruger 636	Room D	590+/-85	1360	1283-1421
Kruger 635	Room C	660+/-60	1290	1278-1390
Kruger 640	Room E	685+/-60	1265	1265-1386
Kruger 641	Room E	705+/-60	1245	1261-1379
Kruger 650	Pithouse	715+/-55	1235	1260-1285
Beta 637	Pithouse	860+/-90	1090	1032-1261
Beta 633	Room B	870+/-60	1080	1039-1225
Kruger 639	Room E	970+/-80	980	988-1159
* Calibrated dates are 1-sigma range (after Allison 1996).				

Table 16. Radiocarbon and Dates From AZ B:6:44, The Pinenut site (Westfall 1984).

2010). If these features are in fact light habitations, as they were suspected to be at Mt Trumbull, the alignment may represent an early residential feature associated with the initial occupation. Construction of the pithouse would have destroyed whatever ephemeral features it contained.

While shallow (in part due to bed rock) and benched - in the early pueblo II style, conceivably the pithouse was contemporary with the F1 roomblock. Deep pithouses without benches, in association with roomblocks such as Feature 1, are a common configuration for Late PII/III sites on the Grand Staircase. It is not clear if an attempt to tree-ring date the timbers in the pithouse was made. Even if it was, the Mammoth Creek chronology (circa 1992) might be able to establish the temporal

relationship of the pithouse with the roomblock.

The projectile point collection is dominated by small, basal-notched points (cf. Parowan Basal notched). The lack of Bull Creek style points is surprising on such a late site, but is consistent with the essentially Virgin ceramic assemblage.

In general, the Pinenut site displays artifact assemblages, ceramic types, architectural style and layout as well as a lengthy history of construction events, that are consistent with the Virgin pattern found throughout the region during early and late Pueblo II times. Based on ceramics, primary contacts appear to have been with Shinarump production east of Kanab Creek, Virgin Series to the north, and Moapa Series to the west.

VIRGIN ANASAZI CHRONOLOGY ON THE GRAND STAIRCASE

Discussion

The primary objective of a temporal framework is to be able to place sites, or portions of them, in time through the identification of diagnostic artifacts and features. By developing a local sequence of culture change we can identify site distribution patterns at particular points in time, consider external relationships with other culture groups and correlate environmental shifts with culture change (Dean 1985).

Several temporal schemes have been offered for the Virgin culture area. All are either based on the Pecos Classification system (McGregor 1965) or are a reaction to it. Fairley (1989) provides a good historical overview of temporal subdivisions used since the 1930's for the Virgin culture area. To briefly review, the earlier schemes relied on ceramic assemblages as temporal markers (Harrington 1930; Gladwin and Gladwin 1934; Colton 1952). Essentially, they were based on ceramic analogs of types tree-ring dated in the better known core Anasazi area. Shutler provided a more complete description of phases based on his work in the Moapa Valley (Shutler 1961). He employed architectural traits, artifact types, site plans and layouts to describe the Puebloan occupation of the Muddy and Virgin rivers in southern Nevada during Basketmaker II and Pueblo III times. This time span which is best documented at Lost City is divided into four phases: The Moapa Phase, the Muddy River Phase, the Lost City Phase, and the Meas House Phase" (Shutler 1961:67). Only a single radiocarbon date is cited for this 1,450 year sequence of culture change; today no more than a handful of radiocarbon dates and no tree-ring dates tie the Muddy/Virgin sequence with other areas of the Virgin culture area. Even so, Shutler's phase divisions continue to be used beyond the Lower Virgin River drainage.

Although Shutler's divisions of material culture traits were intended to identify specific periods of time, he prefaced them with a statement that would hinder and haunt future efforts to nail down Virgin sites to specific time periods: "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" (Shutler 1961:66). This was echoed by Thompson (1986:356) "In the case of the Western Anasazi, however, the appearance of corrugated pottery does not bring an end or even a sharp decline in the manufacture of plain gray vessels." In a similar vein, regarding architecture Thompson suggests; "...that when a new architectural form is introduced, older forms do not necessarily disappear" (Thompson 1982:115). Such a situation is anathema for those attempting to cross-date sites using ceramics and other material culture traits. This apparent persistence of early traits in late contexts has recently been accounted for as a product of the Virgin settlement - a pattern of periodic reoccupation that involves the incorporation of old structures into new architecture and the remodeling of roomblocks that often results in the incorporation of "old wood" into new structures and the mixing of early and late ceramic assemblages (Dalley and McFadden 1988; McFadden 1996).

During the late 1970's archeologists recording sites and reporting on the excavation of Virgin sites in the St George Basin, the uplands of southern Utah and the Arizona Strip have employed a less than explicit temporal framework with which to organize sites. Although Thompson had run a few radiocarbon dates at Tuweep, some very early and others quite late, they hardly constituted a chronology. At that time (as late as 1980) only a single dendro date (Aikens 1965) and virtually no radiocarbon assays existed for southwestern Utah. The temporal sequence was necessarily a relative one; it evolved as sites were excavated and dates were acquired, eventually dates bracketed locally diagnostic ceramics and architecture - a process that continues to be refined. Horizons for significant material culture introductions (e.g. the "Pueblo II Expansion") were narrowed to permit better cross-cultural comparisons. The sequence was eventually extended on both ends to include an early Basketmaker III period as well as a very late "silent" Pueblo III evidenced by little other than the dates themselves (Figure 110).

Cal. Years	<u>Grand Staircase</u> Virgin Anasazi This volume	<u>Kaiparowits Plateau / Escalante Drainage</u> “Virgin/Kayenta” “Fremont”	
1300		Abandoned	
1200	Pueblo III	Fiftymile Mt. Phase	Late Formative Period
1100	Late Pueblo II		
1000	Early Pueblo II		Wide Hollow Phase
900			
800	Pueblo I		
700			
600	Late BM III		
500	Early BM III		
400			Escalante Phase
300			
200	Basketmaker II		
100			
0			
100			
200			

Figure110. Proposed Formative Chronologies for GSENM.

Advances in tree-ring dating, i.e. the establishment of the Mammoth Creek chronology in 1987, eventually validated Stallings' (1941) date of A.D.217 for Cave du Pont (Nusbaum 1922), as well as even earlier dates for a similar site with Cave Valley style pictographs (42Ka1576). This was exciting given that only a few years earlier Florence Lister had questioned the possibility of a "neatly stratified historic reconstruction beginning with early and ending with late" (Lister 1964:67). Just as important, the tree-ring dates confirm and in most cases support, the radiocarbon date chronology.

Terminology for temporal periods has been consistent since the mid-1980's (Dalley and McFadden 1985, 1988). It is essentially a local adaptation of the Pecos Classification using adjectives early and late to denote significant divisions within each period. "Late PII" was initially employed to describe the terminal occupation sites because PIII ceramics were absent. "Early PII" was eventually defined by common usage at a UPAC meeting in the early 1980's as "the period immediately prior to late PII, but after Pueblo I" because they bracketed what appeared to be a temporally vague phase but one well defined by material culture traits. The period was perceived as all the more significant because its termination marks the onset of the "Pueblo II expansion" defined by the onslaught of new ceramic and architectural traits. To be sure, the periods were not imposed upon the data; rather, logical temporal units were defined by material culture traits and then dated.

Although discussions of temporal complexity occur in the Virgin literature, nowhere is there to be found an explicit temporal framework based on local dates and data. In *Virgin - Kayenta Cultural Relationships* Aikens (1966) viewed the situation as such:

"The phase dates of both Colton and Shutler are derived from ceramic cross-dating, with phases being attributed essentially the same dates that have been established for their analogues in the Kayenta region. Absolute dates from the Virgin area which are relevant to the Pueblo occupation are a single tree-ring date of ca. A.D. 200 for a Basketmaker

II site near Kanab, Utah (Stallings,1941), and several C-14 dates from Willow Beach (Schroeder,1961) and Stuart Rockshelter (Shutler, et al., 1961) in southeast Nevada, which contain Pueblo or Basketmaker components. These dates are too few and by their nature too unspecific to be considered as complete verification of the definite phase dates which Colton and shutler offer, but they do support them as far as they go; hence, the phase dates given by these authors may tentatively be accepted, pending the establishment of a full tree-ring or C-14 chronology for the area" (Aikens 1966:4).

Progress on Virgin chronology increased during the late 1970's and 1980's - largely as a result of the Cedar City Districts cultural resource management program. Even so, as recently as 1986 Thompson stated:

"Although over 50 radiocarbon dates have been obtained in southwestern Utah and in northwestern Arizona within the last decade and a half, the distribution of those dates is uneven and many more are needed. Work in the Western Anasazi area is further handicapped by the lack of a dendro sequence, although a beginning appears to have been made. This means that Western Anasazi studies continue to rely on ceramic cross-dating as a working tool. While some earlier writers, including the present one, attempted to calculate a time - lag for the interval needed for design styles to 'migrate' from the east, recent practice has been to accept the dates for analogous painted styles as they have been identified in the Kayenta. There can be no question but what this may introduce some inaccuracies, but greater precision in dating will come with accumulated information" (Thompson1986:354).

The correlation tables below (Tables 17, 18, 19) summarize ceramic and architectural data on the Grand Staircase. They are purely descriptive observations on material culture associations that have been the basis for assigning cultural affiliation and period on the Intermountain Antiquities Computer System (IMACS) site form since the 1980's.

Kanab Creek to Paria River	Pottery Assemblages
Complex A	Mesquite Gray (+ brownware variety)
Complex B	Mesquite Gray, Mesquite B/G, Shinarump Gray
Complex C	North Creek Gray (Washington variety), Washington B/G, Shinarump Gray, San Juan Red Ware rare
Complex D	North Creek Gray, St. George B/G , Shinarump Gray, Shinarump B/G St George style (rare), San Juan Red Ware (rare)
Complex E	North Creek Corrugated, Washington Corrugated, North Creek B/G, Hildale B/G, Shinarump Corrugated (Tusayan and Moenkopi styles) Shinarump B/W, (Dogoszhi and Sosi styles), Tsegi Orange Ware (Medicine B/R, Tusayan B/R, Citadel and Tusayan Polychrome
Complex F	Above plus all types of Shinarump Redware with diminishing TOW; increasingly aberrant white ware designs including Flagstaff B/W.
Upper Virgin River Drainage (East Fork)	
Complex A	Mesquite Gray (+brownware variety?)
Complex B	Mesquite Gray, Mesquite B/G
Complex C	North Creek Gray (Washington rim variety), Washington B/G
Complex D	North Creek Gray, St George B/G

Table 17. Complexes of commonly occurring temporally diagnostic pottery types from localities on the Grand Staircase Physiographic Section.

Aceramic	Bedrock cists Slab-lined cists	Non-standardized pithouses; various depths, diameters, and floor features	AZ:B:1:35
A,B,	Bedrock cists Deep slab lined cists, random patterning	Shallow, benched pithouses with antechambers (early) and vent shafts (late). Random floor features, pits and bins. Jacale walls.	42Ka1796 42Ka2780 42Ka4280
C	Deep oval cists with masonry collars, aligned; Connecting pavements (late)	Shallow, benched pithouses with standardized floor features; pits, footdrum/vault?, ash pits, shaft or niche ventilator. Jacale walls.	42Ka4859 42Ka4280
D	Shallow, rectangular room/cists abutting; slab-lined with jacal superstructure	Shallow, benched pithouses with niches or vents shafts, standarized floor features; pits footdrum/vault?, niche or shaft vent. Adjoining light surface rooms/ramadas	42Ka1969 42Ka1076 42Ka2667 ZNP-3
E	Masonry rooms and linear roomblocks (ladder and accretional construction). Slab paved floors (typical)	Deep masonry lined "kivas"; Individual masonry surface rooms. ----- Courtyard layouts with integrated residential/ storage "L" shaped roomblocks.	42Ka1812 42Ka1504
F	Jacal and masonry rooms. Slab paved floors. Ladder and accretional construction.	Courtyard and plaza layouts (accretional construction). Earthen pithouses but persistence of "kivas")	42Ka3976 42Ka1568 42Ka1978

Table 18. Correlation of storage and residential architectural types with ceramic complexes.

Complex A	Early Basketmaker III	A.D. 400/500-600
Complex B	Late Basketmaker III	A.D. 600-700
Complex C	Pueblo I	A.D. 700-900
Complex D	Early Pueblo II	A.D. 900-1050/1100
Complex E	Late Pueblo II	A.D. 1050/1100-1150
Complex F	Pueblo III	A.D. 1150-1250+

Table 19. Correlation of Pottery Complexes with the Pecos Classification.

Archaic-Formative Transition B.C. 1800-A.D.1

Few sites on the Grand Staircase have been dated to the period immediately preceding the relatively well known Basketmaker II era. The handful that have been reported are so few in number as to only hint at the presence of a large enough population to accept the Formative lifeway (Figure 111). Further, all of the available dates are the result of limited excavations that lack the context to flesh in the local adaptation. Still, the wide distribution of late Archaic rock art styles, and particularly Gypsum projectile points, suggests that there was no occupational hiatus on the Grand Staircase, just prior to the introduction of agriculture, as has been argued for the Four Corners area (Geib and Davidson 1994).

Models for the Adoption of Agriculture

The importance of terminal Archaic Period for Formative studies on the Grand Staircase is to define the natural and social environment into which agriculture was introduced. Two scenarios for the introduction of agriculture have been proposed: 1) the migration model championed by Berry (1982) and Geib and Davidson (1994); 2) the diffusion model that assumes a preexisting population of hunters and gatherers (Jennings 1978; Smiley 1994). Of course, as Geib and Davidson (1994) are quick to point out, while the occurrence of an occupational hiatus might strengthen the migration model, it is “not a critical piece of supporting evidence” (Geib and Davidson 1994:201). On the other hand, neither does demonstrating the presence of a population of hunters and gathers on the Grand Staircase necessarily prove the in

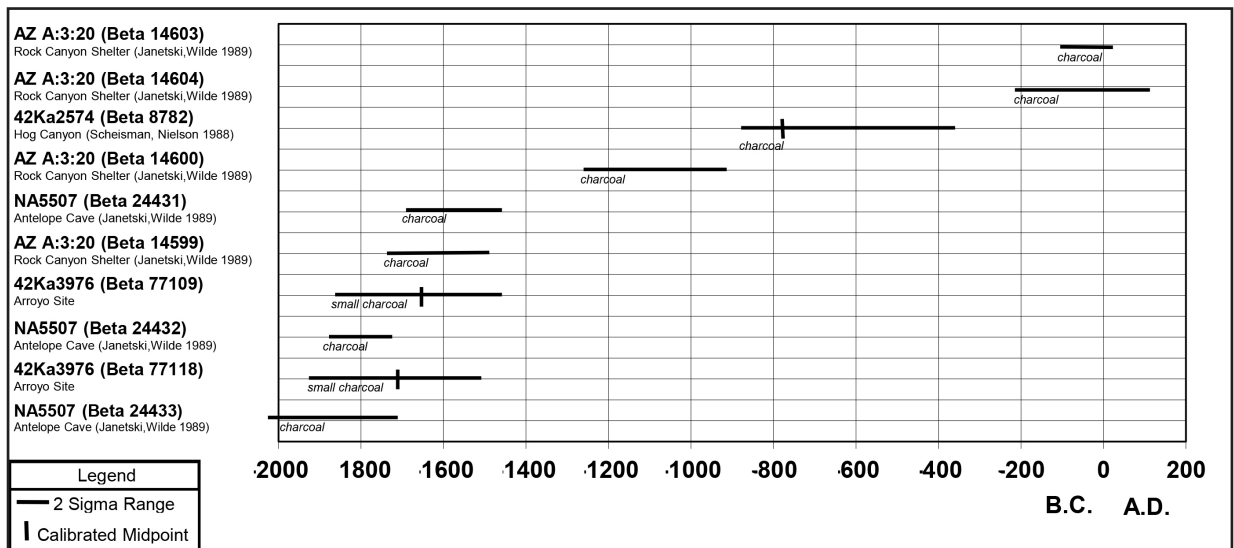


Figure 111. An array of selected radiocarbon dates from the region (Late Archaic-Transitional).

situ diffusion model. In fact, there is evidence that supports both the migration and diffusion models for the introduction of agriculture on the Grand Staircase.

From an evolutionary/ecological perspective, the pre-existing adaptive milieus of the Virgin culture area (lowland/riverine, upland plateaus) versus that of the varied niches of the Escalante River drainage, we might expect differential acceptance of maize by Archaic groups with different adaptations. Further, there is some evidence to suggest that population density in the Escalante drainage during the terminal Archaic may have been greater than on the Grand Staircase; the existence of a well-adapted viable population would probably resist the influx of a large group of farmers from the Basin and Range as has been proposed (Berry 2000). Geib and Bungart (1987) have proposed that the bow and arrow gave BMII era Fremont just such an advantage over horticultural populations that retained the atlatl and dart.

Gypsum/White Dog Dart Point Distributions

Late Archaic Gypsum points from the Mohave Desert date from about 2000 B.C. to A.D.500 (Warren 1980). Gypsum dart points are relatively abundant and are widely distributed across the Grand Staircase as well as the Kaiparowits Plateau (Geib et al. 1999:5-32; Kearns 1982). They are also found in the Escalante drainage (Hauck 1979), the Circle Cliffs (Tipps 1988), the lower Glen Canyon Benches (Geib 1989), and the Arizona Strip (Altschul and Fairley 1989). An unprovenienced assemblage of Gypsum points was collected on public lands and was eventually returned to the BLM (Figure 11). Most, if not all, of these points were said to have been found cached on the terrace between the Vermilion and White Cliffs. Seven were made of agate found in the Petrified Forest member of the Chinle, which is exposed nearby at the base of the Vermilion Cliffs; two were made of Kaibab chert, whose source is probably the Kaibab Monocline bordering the south edge of the Grand Staircase.

Until recently, few Gypsum points have been found in dateable excavation contexts on the Grand Staircase. However, five Gypsum points (Figure 14) are reported from "secure Basketmaker II proveniences" at the Reservoir Site (Eccles and Walling-Frank 1998; 10.25). Apparently, the

temporal range for Gypsum dart points on the Grand Staircase extends into the Formative Period.

White Dog corner-notched dart points (e.g. Figure 20) are considered diagnostic of BMII in the Four Corners area. They also occur on the Grand Staircase in good Basketmaker II contexts by A.D. 200 (see 42Ka3576, 42Ka1168). Their co-occurrence with Gypsum points on the Grand Staircase is problematic but clearly they could have been introduced by immigrant agriculturalists.

Geib (2000) has described a Basketmaker flaking technique using unique "horn flakers." Reportedly an eastern method, its occurrence offers support for population movement. Although examination of the Grand Staircase points for use of this technique has not been performed at this point, future analysis of curated points might provide an additional line of evidence for the diffusion - migration controversy. Confusing the issue a directly dated specimen from Tibbet Cave on the Kaiparowits Plateau which produced an unexpectedly late date of A.D. 960-1040 Beta-155687. Geib points out that it was associated with Emery Gray and may well be a Fremont artifact (Geib et al. 2001).

Rock Art

Barrier Canyon style rock art supports the case for Archaic-Formative continuity, or at least the lack of a hiatus during the Late Archaic. This style is widespread, occurring in both the Escalante and Grand Staircase regions, and is generally attributed to the Late Archaic period circa 1900 B.C. - A.D. 300 (Tipps 1995). Local examples can be found on the north rim of the Grand Canyon (Red Point, Shamans Gallery) and also on the Grand Staircase. Neil Judd depicts an example in Cottonwood Canyon at 42Ka5060 (Figures 12, 13). Broken Arrow Cave, on the south margin of the Kaiparowits Plateau, yielded Archaic through Formative radiocarbon dates and a range of rock art styles that may be coeval (Figure 10).

Local rock art styles on the Grand Staircase during the Basketmaker II period appear to have little in common with the Four Corners Basketmaker anthropomorphic style (Figure 16). Taken as a measure of social distinctiveness the imagery supports the scenario that agriculture on the Grand Staircase was adopted by a local population rather than introduced by a migratory group.

Settlement Patterning

Most of the late Archaic dates presented here are from rock shelters that functioned as temporary camps and caches. While rock shelters offer an abundance of subsistence and cultural data, they can hardly be considered representative of the overall settlement pattern. On the Grand Staircase the Arroyo site provides a potential model for late Archaic adaptation. Coinciding with the on-set of the Neoglacial circa 1900 B.C. (Tipps 1995) the data from Arroyo suggests an adaptation based in valley environments, oriented to harvesting locally available flora, and situated to exploit both large and small faunal resources. The canyon environment of Kitchen Corral, like the other north-south drainages on the Grand Staircase, offered access to both game corridors and winter range. The overlying deposits from the Late PII/III occupation at Arroyo yielded abundant big-game remains that appear to have been locally procured - it seems likely that preceding Archaic populations could have done the same.

The Archaic occupation at Arroyo was deeply buried in the alluvium of Kitchen Corral Wash. If the preferred location for late Archaic residential sites was in similar settings subject to burial - not to mention overlying puebloan deposits, it may be difficult to establish the geographical and temporal distribution of this key site type.

If semi-permanent base camps are, in fact, part of the Late Archaic settlement pattern and can be demonstrated to persist into the last centuries of the first millennium B. C., the case for in situ acceptance of the agriculture will be strengthened; to the extent that classic Basketmaker II material culture traits are identified and dated, the migration scenario will be supported. At this point, a model of differential acceptance of agriculture by indigenous foragers, through a process of both diffusion and perhaps some migration, probably best represents the data for both the Grand Staircase and Escalante drainage.

Basketmaker II 100 B.C. - A.D. 500

Talbot (1998) has provided an excellent review of Basketmaker II period. Based in part on dates from the Reservoir Site, as well as regional material culture and settlement patterns, he suggests that the Virgin Basketmaker II - early Basketmaker

III periods can be divided into three phases: "a phase division is justifiable at this point, one that encompasses much of, if not the entire Virgin area during the BM II period, and that takes into account the broad developmental changes that were occurring" (Talbot 1998:8.22). The Vermilion Phase (B.C. 300 to A.D. 1) is described as the Virgin equivalent of the White Dog Phase to the east; material culture is undifferentiated between the two areas. Virgin area peoples were "probably dependent" on maize agriculture at this time.

The Moapa Phase (A.D. 1 to A.D. 400) is restricted to "the first four centuries A.D., the period of time reserved for the Lolomai Phase and Grand Gulch Phases to the east (Talbot 1998:8.22). It reflects "a rather sudden shift to settled village life (Talbot 1998). The Reservoir site is the best dated example of a village site reported on the Grand Staircase. Supporting Talbot's dates for this phase region wide, Lyneis (1999) has reported two AMS dates on corn from Black Dog Cave along the Muddy River in southern Nevada. The two-sigma calibrated dates, corrected for isotopic fractionation are: A.D. 238-429 (AA25317) and A.D. 223-419 (AA25318). These dates are similar to those from Cave du Pont. As regards settlement patterning, neither of these sites seem to have functioned as full time residences.

The Mt. Trumbull Phase (A.D. 400-600) "represents the terminal BM II to early BM III transition period." During this period there is a movement of BM II groups to the uplands and an adaptation to dry farming. Aggregation of households is said to have occurred (Talbot 1998; 8.23). Concerning ceramics, the classic indicator of BM III, pottery during this period was "transitory in quality and occurrence until after A.D. 600. Further, only in BM III times does pottery become common and hence diagnostic in the traditional developmental sense" (Talbot 1998:8.23) (Figure 112).

Although Talbot's postulated developmental phases are in general agreement with the temporal framework presented here, the more general Pecos terminology will be retained until diagnostic material culture and settlement patterns are more firmly established for each of the phases. The few relevant radiocarbon (Figure 113, Table 20) and tree-ring dates (Figure 114) available from the Grand Staircase suggest a B.C.100- A.D.400 range

BC	300	200	100	I	100	200	300	400	500	600	700	AD
	Vermilion Phase				Moapa Phase			Trumbull				
	?				BM II			E. BMIII		L. BMIII		

Figure 112. Comparative chart of Talbotts (1996) Basketmaker Phases with this volume.

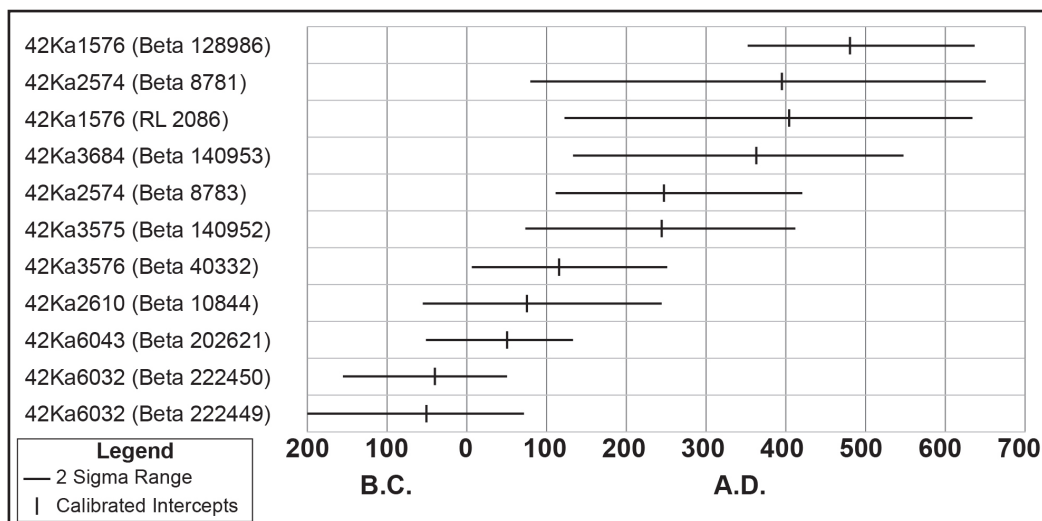


Figure 113. Array of selected radiocarbon dates on the Grand Staircase (Basketmaker II).

Site #	Laboratory Number	C 13/12	Material	BP age	2 Sigma Range	Cal. Curve
42Ka1576	Beta- 128986	-9.3	corn cob	1570+/-70	AD 350-635	AD 465, 480, 520
42Ka1576	RL 2086	-	wood/char.	1670+/-110	AD 120-630	AD 405
42Ka2574	Beta- 8781	-	carbon	1680+/-130	AD 75-645	AD 395
42Ka2574	Beta- 8783	-	carbon	1780+/-60	AD 110-420	AD 245
42Ka3576	Beta- 40332	-	wood	1890+/-60	AD 5-250	AD 120
42Ka2610	Beta- 10844	-	charcoal	1940+/-70	BC 60-AD 240	AD 75
42Ka3575	Beta- 140952	-9	corn cob	1790+/-70	AD 75-410	AD 240
42Ka3684	Beta-140953	-10.6	corn cob	1700+/-80	AD 135-540	AD 365
42Ka6032	Beta-222449	-7.3	bone coll.	2060+/-60	BC 200-AD 70	BC 50
42Ka6032	Beta-222450	-7.9	bone coll.	2040+/-40	BC 160-AD 50	BC 40
42Ka6043	Beta-202621	-9.1	corn cob	1960+/-50	BC 50-AD130	AD 50

Table 20. Radiocarbon dates from the Grand Staircase (Basketmaker II).

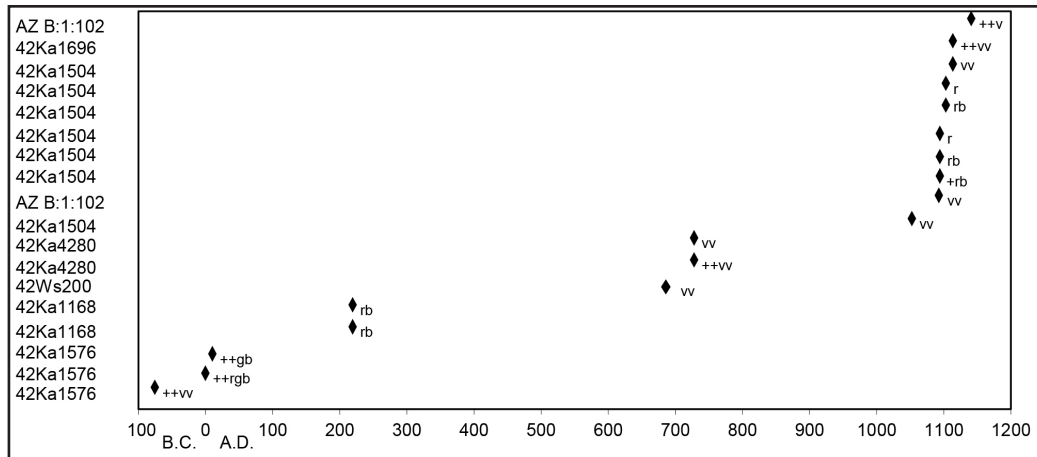


Figure 114. Virgin Anasazi tree-ring dates.

for the Basketmaker II period. After that date, pithouses have multiple slab-lined storage cists associated with them indicating a significant change in settlement patterning and possibly in subsistence practices as well.

Material Culture Traits

The resemblance of Basketmaker material culture on the Grand Staircase with that from the Four Corners area was noted early in the 20th century (Kidder and Guernsey 1922); basketry techniques, slab-lined cists, square toed sandals and corner-notched dart points were all taken as clear evidence of contact with populations to east and as supporting evidence for migration. The perspective that the Virgin region is the recipient of cultural impulses, rather than a hearth of innovation, persists to this day. In fact, cases can be made for internal development, diffusion, as well as actual migration. The temporal and spatial dimensions of the mix of local material culture and classic Basketmaker traits remains one of the more challenging problems of Virgin settlement history.

Storage Architecture

Two forms of storage unit are described in this volume; the slab-lined cist represented at Cave du Pont and a good many other sites in the Kanab Creek drainage and bedrock cists. Both are capable of holding large volumes and occur in multiples. It seems likely that the simple earthen pit may have preceded the cist but this is not clear. In fact, both forms were in use in the first centuries A.D. Both

forms persist and evolve over the succeeding periods, as will be described in the succeeding sections.

Bedrock cists are difficult to date directly but at 42Ka3575 a maize cob was securely dated to Basketmaker times (Table 20). Secondary use as burial pits was common in Johnson Canyon where aceramic, presumably BMII burials were interred at 42Ka2548. Other cists showed evidence of having been sealed with clay and slabs. Bedrock cists are viewed here as a local phenomenon associated with alcoves formed of easily excavated Navajo Sandstone.

The co-occurrence of large and varied pictograph panels and storage facilities (see 42Ka1576) clearly indicates long-term use, but may also represent “ownership” – some means of establishing tenure for temporarily occupied storage sites may have been desirable.

Pithouse Architecture

True pithouse architecture on the Grand Staircase appears to coincide with the alcove storage sites and isolated burial sites. Both individual structures and pithouse clusters are known. The apparent lack of on-site storage is distinct from the succeeding BMIII period and raises the question how alcove storage and burial sites related to open pithouse residences.

At present the best documented example is a cluster of 11 pithouses from the Reservoir site. These structures display great variation in size and style and have few associated storage features. Structures tend to be circular, range from 4m to over 6m in

diameter and are of moderate depth. Floor features generally include a central hearth and sundry pits. Ventilator shafts were not encountered. At least three and possibly more, occupational episodes are represented (Walling-Frank 1998:6.1).

Rock Art

Anthropomorphic “doughboy” pictographs associated with the alcoves at 42Ka1576 (South Fork), Cave du Pont, several sites in Cottonwood Canyon (Judd 1927: Plate 60a), and on the eastern Grand Staircase by Steward (1941: Figure 61d) appear to represent a distinctive local Basketmaker style (Figure 16). In the absence of San Juan anthropomorphic style figures reported from the Grand Staircase, the ubiquity, range, and associations of doughboy pictographs and petroglyphs argues for the emergence of a social identity distinct from other Basketmaker II populations. The apparent absence of the style in the Escalante drainage suggests that early Fremont and Grand Staircase populations were discrete during BMII times.

Mortuary Practices

Basketmaker burials on the Grand Staircase are known from Cave du Pont (Nusbaum 1922), Cave 1 (Judd 1926), and through the work of Edgar (1994) at 42Ka3575, 42Ka3576, and 42Ka2548. Most recently Zweifel (2006) reports on a complex multiple interment at the Tommy Turf site (42Ka6032) in Kanab. In addition, isolated shelters with human remains, generally remote from residential or storage sites, are also known on the Grand Staircase (IMACS records). Off-site burial practices might be interpreted as a result of a less sedentary, more mobile, adaptation during this period.

Subsistence and Diet

The abundant corn cobs found at Cave du Pont, 42Ka3575, and numerous other sites in the Kanab Creek drainage indicate the importance of maize during the BMII period. C12/13 ratios indicate the high reliance on a maize diet for those individuals analyzed (Martin 1996, 1999) and Tommy Turf (Zweifel 200). The capacity of cists on virtually all sites with storage units attests the importance of a large surplus for multi-family households. In addition, curcubits are known from Cave du Pont and

42Ka1576. By the nature of previous investigations, few economic wild species are documented but the degree of reliance on domesticates appears to be similar to that of the succeeding Puebloan periods (Table 28).

Site Distribution and Settlement Patterns

Most Basketmaker II sites recorded on the Grand Staircase are alcoves used for the storage of maize and as burial sites. While these sites provide dating opportunities that have contributed to the study of material culture and subsistence practices, they do not address the overall organization of settlement. It is not clear to what extent alcoves were used for habitation during the Basketmaker II Period: Cave du Pont and South Fork, both with north aspects, were clearly not suitable for winter residence - although it is conceivable that pithouses were located nearby on the mesa tops.

By their nature, aceramic pithouse sites are difficult to identify and are therefore underrepresented. Those that have been, for example the Reservoir Site near Short Creek and 42Ka2610 near Kanab Creek, seem to lack the voluminous storage facilities we expect on agricultural sites. If the pithouse sites can be demonstrated to have large-volume storage capacity, as well as nearby agricultural opportunities, they may be considered self-sufficient farmsteads; if not, isolated storage sites, located near arable sub-irrigated streams and springs, may represent part of a winter/summer logistical strategy involving discrete summer farming/storage sites and winter pithouse residential sites locate in favorable habitation areas.

A similar distribution pattern has been proposed for the Fremont in the Escalante drainage where a large cluster of Fremont pithouses occur in the uplands in a setting favorable for winter habitation in terms of deer winter range, firewood availability, and southerly aspect - but a poor choice for agriculture. Agriculture, on the other hand, focused on the well-watered canyons as indicated by granaries and camps.

A site type that may represent either seasonal or year-round occupation, are the extensive scatters of tabular stone, soil stain, with sparse ceramics found along the rim of the Shinarump Cliffs. The architectural features represented on these sites have not been investigated; they may hold storage cists, pithouses, or simply be intensive camps. Similar

extensive sites have been noted on mesa tops above Kanab Canyon and Johnson Canyon (Zweifel personal communication 2014). On the Shinarump Cliffs these largely aceramic scatters are located near BMIII pithouse clusters (e.g. 42Ka2780). This seems to suggest occupational continuity from BMII to BMIII in the area. It also presents the possibility that aceramic sites are obscured by later occupations.

**Basketmaker III (Early)
A.D. 400/500 - 600**

Sometime after A.D. 400, possibly as late as A.D. 600 residential sites with large volume storage capacities become common on the Grand Staircase. In addition to moderately deep, benched pithouses with antechambers, clusters of associated slab-lined cists appear to represent long-term storage for individual households. Sites may appear to be village-sized, with several dozen cists and numerous pithouses however, contemporaneity between these household clusters has not been demonstrated. Ceramics are represented by plain gray, coarse sand tempered earthenwares - often very scarce even through the sites were intensively occupied. The shift from dart points to arrow-sized points appears to have occurred early in the period.

Wilson and Blinman (1993) discuss a transitional period between Basketmaker II and III characterized by brownware ceramics that spans much of the southwest. They cite the late fourth to the late sixth century as a period when a "generalized pan-regional adaptation associated with early horticultural developments at periods of low population densities." (Wilson and Blinman 1991:199). Two of the large sites discussed here, 42Ka1796 and 42Ka2780, may represent a local manifestation of this adaptation.

Geib and Spurr (1997) describe a similar period on the Rainbow Plateau when brownware ceramics (Obelisk Utility) came into limited use, arrow sized points were becoming common and open habitations with and without associated storage occur. Based on presence of ceramics alone, this period seems to be well represented on the Grand Staircase. Obelisk Brown Ware, said to be characteristic of the period, occurs in very low densities but was present at 42Ka1796 (identification by Dean Wilson and Kelly Hayes Gilpin 1996). More common is a sand

tempered friable type of earthenware that varies from brown to gray and whose firing was poorly controlled. Although the period is not well dated, and radiocarbon assays are coarse-grained, good examples of this period on the Grand Staircase are 42Ka2780, 42Ka1796, and 42Ka2574 (Figure 115). Based on the presence of Rose Spring style projectile points from the bench of the pithouse at 42Ka2780, the bow and arrow was in use by this time in the Virgin region. Both expedient unifacial points (called "Trumbull" points by Richard Thompson) and nominally Rose Spring types occur (Figure 25).

The production of pottery and a shift from dart points to small arrow points are the temporally sensitive and easily identified diagnostic artifacts that mark the transition to the BMIII period. As horizon markers they are consistent with the goal of using temporally sensitive diagnostics as the defining criteria for establishing distinct periods. Using sheer ceramic quantities as a horizon marker may have merit. Sherds of "Pseudo pottery" at Cave du Pont suggests a knowledge of the concept, but little use for it. Early in the BMIII period several vessel forms were in use (Figures 27, 30 and 31) but quantities remain low.

**Basketmaker III (Late)
A.D. 600 -700**

Late Basketmaker III is assigned to the period when Lino design styles, locally termed Mesquite black-on-gray, become common (Figure 30). Dated sites from this period are few, although the sites themselves appear to be common and are widely distributed from the Paria River to Kanab Creek including relatively high densities along Kitchen Corral Wash, Finn Little Wash, and Seaman Wash drainages. Basketmaker occupation in the Kitchen Corral Wash drainage system may correlate with a buried soil horizon that suggests a period of stability during the seventh century A.D. (Kulp 1995:18). Late BM III sites occupy a range of elevations and environmental niches located between the Shinarump Cliffs on the south and the Wygaret Terrace on the north that span the Grand Staircase from east to west. No late Basketmaker sites have been excavated on the Grand Staircase; consequently, they are better described in the St. George Basin (Dalley and McFadden 1987; Baker

Site #	Laboratory Number	C 13/12	Material	BP age	2 Sigma Range	Cal. Curve
42Ka1499	Beta- 132378	-9.0	Corn cob	1310+/-40	AD 655-780	AD 685
42Ka2574	Beta -8784	-	charred roof beam	1410+/-50	AD 575-690	AD 650
42Ka2574	Beta -8785	-	charred roof beam	1500+/-60	AD 430-660	AD 590
42Ka4280	Beta- 125911	-23.6	small dia. wood	1450+/-40	AD 555-665	AD 630
42Ka1796	Beta- 6284	-	Struct. Charcoal	1510+/-110	AD 340-705	AD 575
42Ka2780	Beta- 16079	-	Ext. Ring Str. Tim.	1610+/-60	AD 340-600	AD 435
42Ka2780	Beta- 16080	-	Ext. Ring Str. Tim.	1660+/-90	AD 210-605	AD 410
42Ka2780	Beta-157843	?	Bone collagen	1390+/-40	AD 610-690	AD 650
42Ka1819	Beta-161896	-9.8	Corn cob	1390+/-70	AD 540-770	AD 650
42Ka4309	Beta-194328	-12.3	Corn husk in mortar	1340+/-40	AD 640-770	AD 670
42Ka4859	Beta-179631	-10.3	Charred seed	1340+/-40	AD 640-770	AD 670
42Ka4859	Beta-179632	-11.6	Charred seed	1300+/-40	AD 660-790	AD 690
42Ka4859	Beta-179633	-10.9	Charred seed	1300+/-40	AD 660-790	AD 690

Table 21. Radiocarbon dates from the Grand Staircase (BM III).

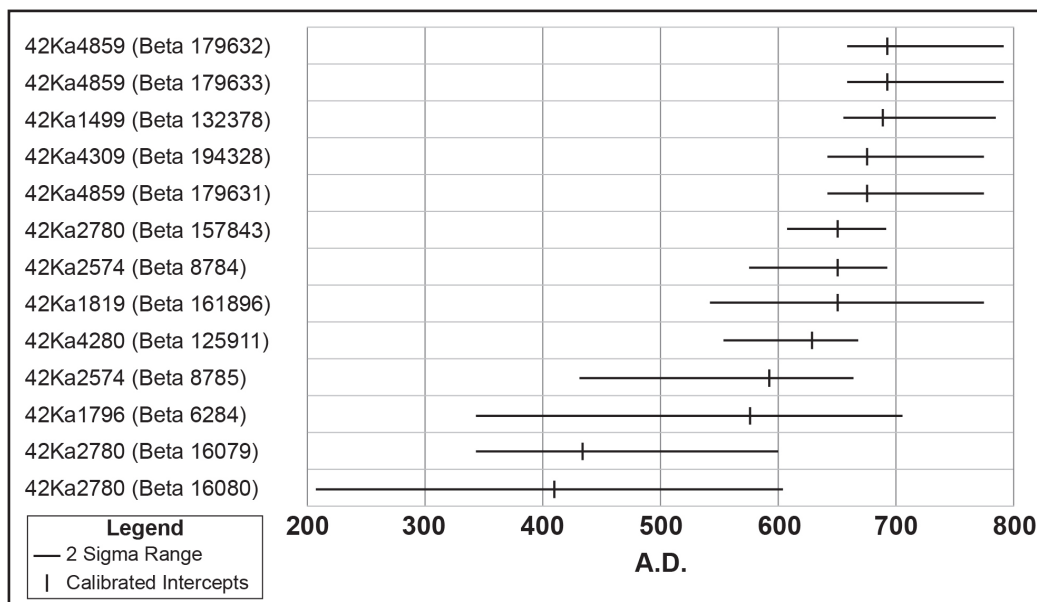


Figure 115. Array of selected radiocarbon dates from the Grand Staircase (Basketmaker III).

and Billat 1992). A review of the Upper Virgin River inventory forms for white wares has not been conducted but there is little doubt they are present (Figure 6).

Rock Art

A single radiocarbon date from Deer Creek Shelter (42Ka1499), provides a rough association of the Cave Valley anthropomorphic style with this period. The consistency of this common style across the Grand Staircase during the early Formative suggests a distinct socio-cultural identity for the early Virgin Anasazi occupants of the region.

Pueblo I A.D. 700-900

Various ceramic forms were present by late BMIII (bowls, ollas, jars) but there appears to be a marked increase in the sheer amount of pottery during the Pueblo I period. Arguably most vessels were used for cooking - an association that may correspond well with the appearance of beans (*Phaseolus vulgaris*) early in the period (see 42Ka4859, Road Kill site).

Unlike the Four Corners area, where the onset of Pueblo I is highly visible, there is a high degree of continuity between Basketmaker III and Pueblo I material culture traits in the region. The Pueblo I period is defined by a set of subtle, but diagnostic traits that include: Washington Black-on-Gray ceramics, an untyped but recognizable plain gray rim form (called Washington Gray by Shutler 1961), the addition of masonry superstructures to alignments of circular to oval subterranean storage cists, and a set of standardized pithouse floor and construction features. Projectile points, appear to be derived from the earlier Rose Spring series. Many have short stems and, arguably, are transitional in form to the early Pueblo II Parowan Basal-notched points.

Pueblo I sites range in size from nuclear family sized units, consisting of a pithouse and several storage cists, to extensive layouts of aligned structural features that may appear as aggregations of family sized units. These "aggregated" sites are among the largest in the region; their size may be attributed either to occupation by a large co-residential group or sequential construction over the course of this 200 year long period. Good examples

of these large sites are recorded on Yellowstone Mesa on the Arizona Strip (Allison 1988), Seaman Wash, Johnson Canyon and Harris Mt. (McFadden 1996). The lack of integrating architecture on these sites, such as kivas or large communal structures, argues against social complexity and suggests they are simply a series of household units.

Natural settings for both large and small sites during Pueblo I are among the most exotic of any period. In the uplands they often occur on isolated buttes or knolls. In the St. George Basin, canyon rims overlooking perennial streams were often favored at the expense of being close to agricultural fields. These locations have sometimes been considered as defensive refuges (Jenkins 1981). An alternative perspective is to consider such site locations as central to a number of, perhaps distant, arable settings - rather than just one, as is typical during most periods. This tactic might be viewed as a response to the variable climatic conditions often cited for the Pueblo I period (Dean et al. 1985). Although there seems to be a tendency for Pueblo I site distribution on the Grand Staircase to favor higher elevations that provide greater effective precipitation (McFadden 1996:14), mid-elevation locales continued to be occupied. It may be significant that site densities along perennial streams in the St. George Basin seem to be particularly high during the Pueblo I period (see Appendix A).

Settlement Patterning

Site distribution data during the Pueblo I period suggest two separate settlement patterns. There is a "normative" pattern of household units consisting of an alignment of storage cists, a pithouse, an activity area or sometimes a light room in between them and a midden. This dominant, or at least most obvious, pattern is characterized by large butte or knoll-top aggregations of households located in optimal settings for large scale agriculture.

Also seen is a less formal apparently logistical pattern involving temporary use of widely dispersed small sites that tend to be located near riparian settings. Examples are Cottonwood Canyon Cave 1, Room 1 (Judd 1926:92); 42Ka 2031, Neaf Spring Alcove; 42Ka1811, Mollies Nipple Alcove (Steward 1937), and 42Ka2147 in Johnson Canyon. Although some variance from the normative household unit/farmstead occurs during all periods, the tendency for these stand-alone storage sites seems particularly

.Site #	Laboratory Number	C 13/12	Material	BP age	2 Sigma Range	Cal. Curve
42Ka1520	Beta 134476	-25.0	Wood	950+/-70	AD 980-1235	AD 1040
42Ka1969	RL 1396	-	Charcoal	990+/-110	AD 855-1270	AD 1025
42Ka1969	Beta-157844	?	Bone	1170+/-40	AD 770-980	AD 880
42Ka1969	Beta-157845	?	Bone	1220+/-40	AD 690-900	AD 790
42Ka2667	Beta 23055	-	Charcoal	1010+/-60	AD 905-920 AD 950-1175	AD 1020
42Ka1811	Beta 109803	-9.7	Corn cob	1060+/-50	AD 885-1035	AD 995
42Ka1811	Beta 109804	-24.4	Twigs	1150+/-40	AD 790-990	AD 890
42Ka1811	Beta 109805	-25.3	Twigs	1290+/-50	AD 655-875	AD 705
42Ka1696	Beta-150671	-10.4	Corn cob	1290+/-60	AD 650-880	AD 700
42Ka2594	Beta 8422	-	Carbon	1130 +/-120	AD 665-1175	AD 905, 920, 950
42Ka2594	Beta 8423	-	Carbon	1100+/-50	AD 865-1020	AD 975
42Ka2667	Beta 23054	-	Charcoal	1120+/-70	AD 775-1030	AD 960
42Ka1504	Beta 26630	-	Charcoal	1140+/-70	AD 720-735 AD 760-1020	AD 895
42WS1365	Beta 10845	-	Charcoal	1210+/-50	AD 690-970	AD 855
42Ka4860	Beta 134478	-24.3	Wood	1200+/-40	AD 705-910 AD 920-955	AD 815, 840, 855
42Ka2031	Beta125910	-8.5	Corn cob	1220+/-70	AD 665-985	AD 800
42Ka4280	Beta131667	-11.2	Corn kernel	1240+/-40	AD 680-885	AD 775
42Ka3360	RL 2084	-	Charcoal	1270+/-110	AD 600-1000	AD 770
42Ka5058	Beta 140951	-25.1	Twigs (from adobe)	1250+/-70	AD 655-965	AD 770
42Ka4859	Beta-179630	-10.8	Charred seed	1230+/-40	AD 690-890	AD 780
42Ka5609	Beta-150670	-10.6	Corn cob	?	AD 770-1040	AD 970
42Ka5628	Beta-150669	-10.8	Corn cob	960+/-70??	AD 970-1230	AD 1030
42Ka7151	Beta-317153	-24.7	wood	1250+/-30	AD 680-830, 840- 870	AD 730,740,770

Table 22. Radiocarbon dates from the Grand Staircase (Pueblo I and Early Pueblo II).

visible during Pueblo I times. This suggests an alternative, perhaps complimentary, settlement/subsistence strategy may have been employed, on a contingency basis, to supplement the “farmstead as fieldhouse” pattern.

A possibly related pattern was identified in the St. George Basin at 42Ws964, a farmstead located along the Santa Clara River. Excavations there revealed several “mini” houses located on sites with otherwise typical Pueblo I layouts (Dalley personal communication 1999). These minimal residences could represent temporary “care-tending” by an individual or two during periods when the site wasn’t fully occupied. Similar small habitations, or temporarily occupied storage units, have been found at 42Ka2147 in Johnson Canyon, Cottonwood Canyon Cave 1 (Judd 1926), and at

Mollies Nipple Alcove (Steward 1941). The large number of radiocarbon dates from the St. George Basin during the period A.D. 700-900 (Appendix A) may indicate an increase in reliance on perennial steams in the basin during the Pueblo I period. That said, it should be noted that the plateaus above the East Fork of the Virgin River, at elevations of about 6,000 feet, also have high concentrations of farmsteads sites (Figure 6). Clearly, both stream associated and dryfarm strategies were viable, at least at times, during the Pueblo I period.

Storage Architecture

Aikens (1965) describes storage architecture at Parunuweap Knoll (Figure 117) that is typical of the period i.e. alignments of non or only partially

contiguous circular to oval cists. Generally deep, the cists are slab-lined with masonry walls constructed behind and extending well above the slabs. Banister, Dean and Robinson (1969) report a tree-ring date of 480p-691vv from Parunuweap Knoll. This type of construction occurs in the uplands as well as the St George Basin. Numerous good examples are known to occur on the Monument.

The well-preserved circular storage rooms at Mollies Nipple Alcove, 42Ka1811 (Steward 1941) and Cave 1 (42Ka5058) in Cottonwood Canyon (Judd 1926) (Figure 58) are similar to those excavated at Parunuweap Knoll (Aikens 1965). Although they could not be dated at the time, these early investigators made astute observations regarding the temporal placement of these unique structures: Steward considered them “transitional” between Basket Maker and Pueblo II (Steward 1941:292); Judd, having documented both Basket Maker and “Cliff-dweller” occupation in Cottonwood Canyon, believed Room 1 had been remodeled by a previously unidentified group he termed “near-Cliff-dwellers” (Judd 1926:95). Similar standing architecture has been recorded in Parunuweap and Hackberry Canyons. All were constructed by lining a pit with massive slabs and constructing a masonry wall on the surface just behind them. The masonry wall was plastered flush with the slabs and topped off with large masses of adobe reinforced with brush. Typically, the pits were nearly one meter deep with a superstructure of equal height; given a diameter of up to 3 meters these structures had large storage capacities. As noted above, they were occasionally used as temporary domiciles (Judd 1926, Steward 1941).

Also in use during Pueblo I times are bedrock storage cists that first appeared in Basketmaker II times. In fact, it seems likely that some are actually reused pits with the addition of an encircling masonry superstructure. In form, they are very similar to the storage units described above (Figure 39). Like their BMII forerunners, bedrock cists with masonry superstructures are restricted to alcoves formed of Navajo Sandstone and are not associated with habitations.

Pithouse Architecture

Although the bench with peripheral post support system continues during the Pueblo I period, the shallow antechamber typical of Basketmaker III pithouses is replaced by a slab-lined vent shaft.

Most striking is the unique set of floor features that becomes standard by A.D. 725 (Figure 118). The presence of sand-filled bins positioned north of the hearth as well as a vault aligned with the hearth - all usually sealed with floor clay, suggests an ideologically related function unique to the Virgin Anasazi. Note that, to date, the vault is known only at ZNP-3 and in the St. George Basin (Figure 118).

“Light” habitations

On some late BMIII – early Pueblo I sites lightly constructed residential rooms of wattle and daub were built in front of the cist alignment. At present the Road Kill site is the best example (Figure 49) but they are also recorded in the upper Virgin River area. It is not known whether these jacales replace a pithouse but it is suspected that they functioned as summer residences. Similar structures occur on both earlier sites with pithouses – LM4 in the St George Basin (Dalley and McFadden 1988) as well as later sites – Dead Raven, 42Ka2667, is a good example (Figure 67).

Dating/Diagnostics

Radiocarbon dates for the Pueblo I and Early Pueblo II periods form a continuous sequence with no convenient break to indicate the end of one period and the beginning of the next (Figure 116). The Basketmaker III sequence that leads into Pueblo I is nearly as smooth, but suffers from a lack of excavated sites. Basketmaker III pithouses generally have an antechamber and randomly positioned floor features; pithouses dating between A.D. 700 and A.D. 900, from both the Grand Staircase and the St. George Basin, have vent shafts and a patterned suite of floor features (Figure 118). After A.D. 900, during Early PII times, changes in pithouse are subtle and reflect the conservative nature of the PI-Early PII transition.

Ceramic style variations between Pueblo I and Early Pueblo II are highly diagnostic. The shift of plain gray jar rim from a shallow curve (Figure 48) to strongly everted forms (Dalley and McFadden 1985:237) is particularly distinctive. The associated white ware type, St George Black-on-Gray, occurs early in the 10th century and is also easily distinguished from the preceding Pueblo I style, Washington Black-on-gray.

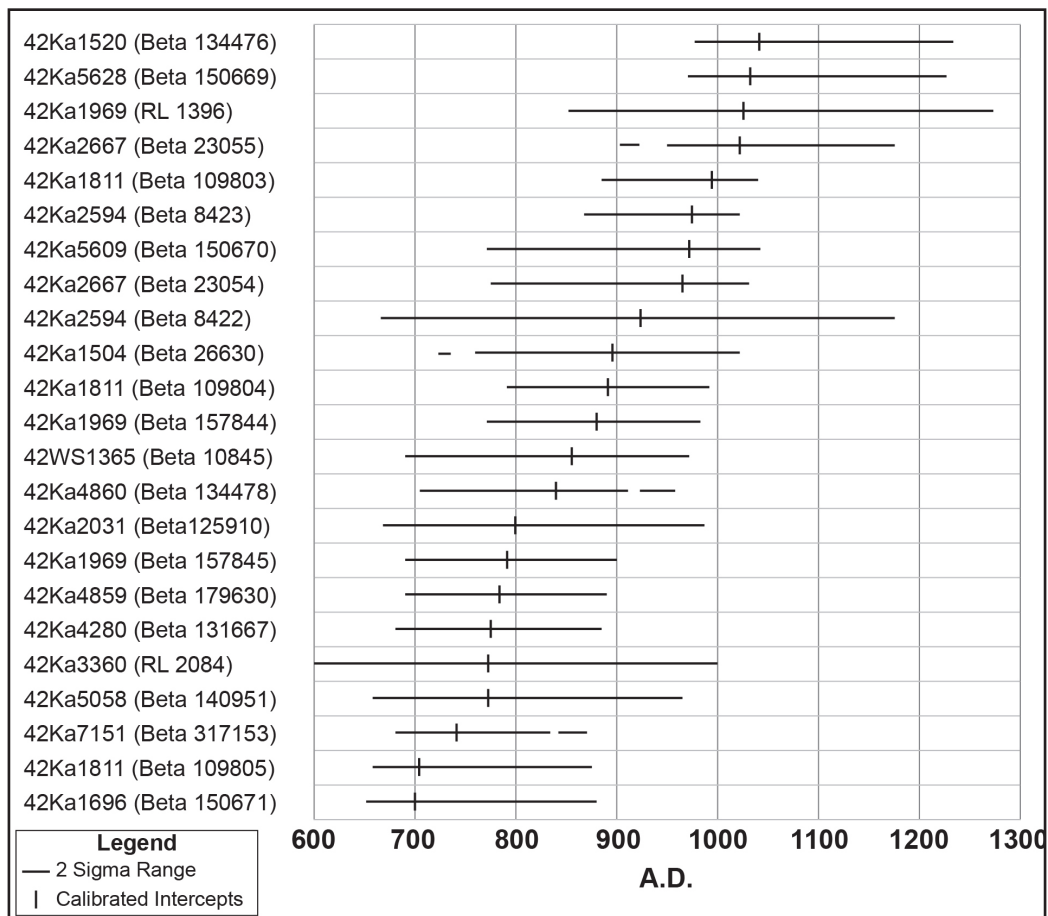


Figure 116. Array of selected radiocarbon dates on the Grand Staircase (Pueblo I and Early Pueblo II).

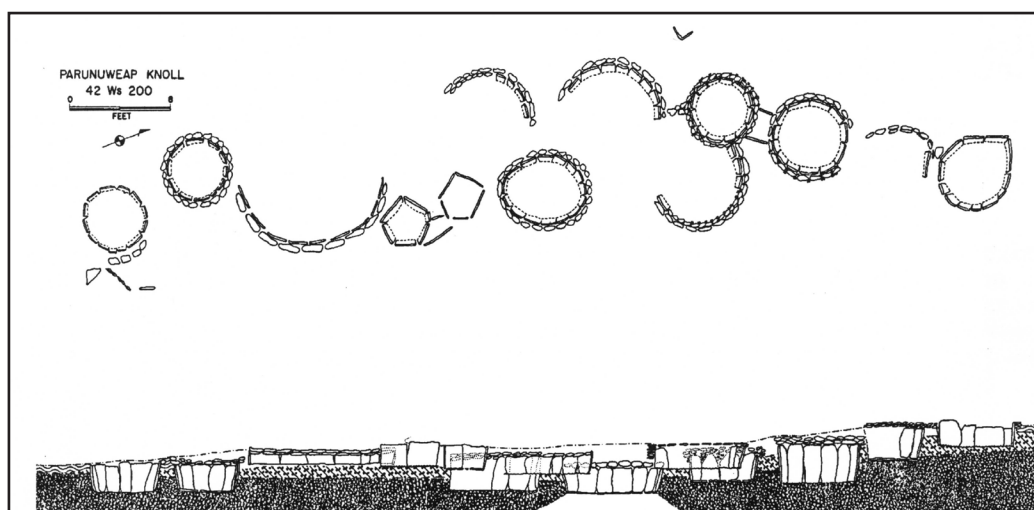


Figure 117. 42Ws200, Parunuweap Knoll; plan map and composite profile (after Aikens 1965).

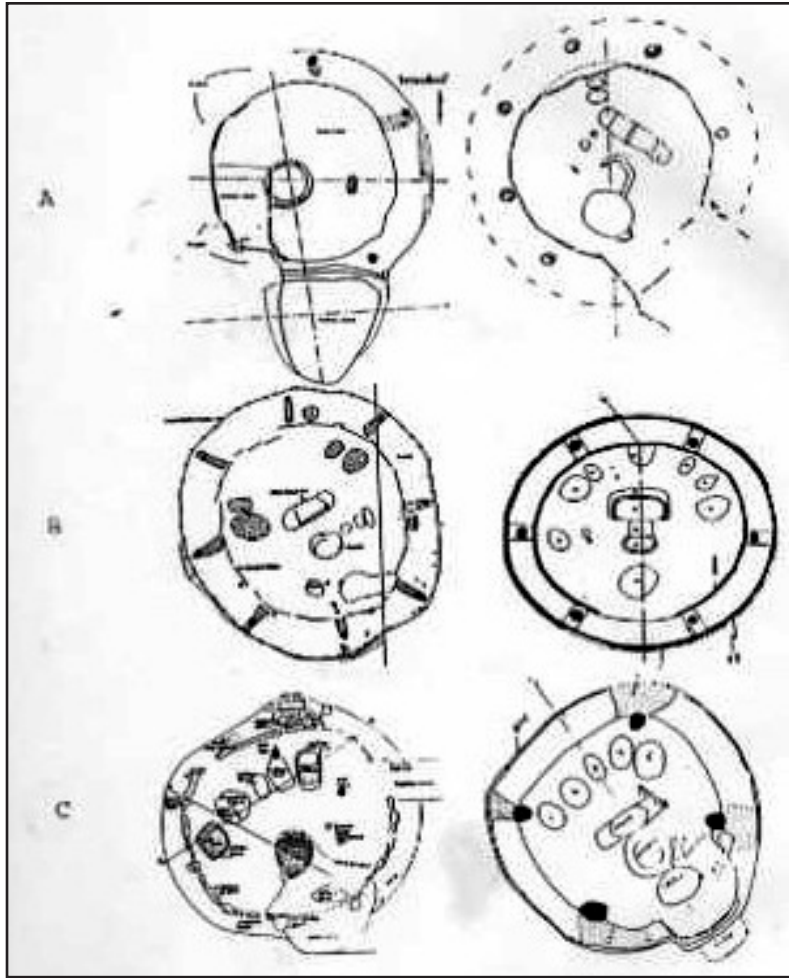


Figure 118. Virgin Anasazi pithouse plans. a) Early BMIII; 42Ka1796, 42Ka2780; b) Pueblo I, 42Ws388 (Walling et al. 1986) ZNP-3 (Schroeder 1955); c) Early PII, 42Ka1969 (Kvamme and Nickens 1981) and 42Ws 404 (Dalley and McFadden 1988).

Early Pueblo II A.D. 900 to A.D.1050-1100

As the array of radiocarbon dates (Figure 116) suggests, the transition from Pueblo I to early Pueblo II is uninterrupted and forms a continuous sequence. The primary diagnostics that identify this period include: a readily identifiable ceramic assemblage, a shift from deep storage cists to shallow surface rooms constructed of jacal with both floor pavements and perimeter slab uprights, and subtle changes in pithouse architecture.

Site Distribution Patterns

The sites dated in this volume occur along perennially watered Kanab Creek (42Ka1969, 42Ka6293) and Johnson Canyon (42Ka2667). The

overall distribution of small farmsteads during this period spans a wide range of elevations and physiographic settings ranging from 6,000 feet to 7,000 feet dryfarm settings above the East Fork of the Virgin River where they account for 37% (n=52) of the sample, to a variety of alluvial outwash and dryfarm settings east of Kanab where they account for 20% (77) of the sampled sites (Figure 6). Elevations there range from 5,000 feet to 6,000 feet.

The distribution of isolated storage granaries noted during the preceding Pueblo I period seems to persist; good examples are 42Ka1520 and 42Ka1694 in the East fork of the Virgin River drainage (Figures 61, 65). These structures are both essentially above-ground rooms with vertical entries. Neither have holes on each side of the entry

suggesting closure with the “loop and stick method” common during the Late PII Period. Rather, they appear to have been sealed with a sandstone slab placed in a clay coping. Masonry is essentially drylaid, poorly bonded, unshaped, tabular sandstone which in places has been heavily muddled.

Ceramics

The ceramic assemblage for the period A.D. 900-1050 is viewed as a direct outgrowth of the preceding Pueblo I period. St. George Black-on-Gray, frequently considered to be an analog of Black Mesa Black-on-White, is the only design style. Plain gray jars take on a globular shape and have a distinctively everted rim form (Dalley and McFadden 1985, 1988).

On the east half of the Grand Staircase, largely encompassed by the GSENM, the ceramic picture is more complex. Here, an apparently local development of a gray ware called Shinarump by Colton (1952) accounts for a near majority of sherds on both Pueblo I and early Pueblo II sites. This plain gray type may have roots in the BM III period but this remains to be demonstrated. During early Pueblo II Shinarump pottery rarely, if ever, has painted designs. St. George Black-on-Gray designs occur only on bowls with North Creek Gray paste and temper. It is unknown whether this type is locally produced or imported from west of Johnson Canyon.

Storage Architecture

Storage architecture during early Pueblo II shifts from deep cists to shallow rectangular slab-lined units with wattle and daub superstructures. These “rooms” are contiguous but are constructed separately without common walls. They appear to represent accretional growth of the roomblock, as opposed to its construction at a single point in time. True residential rooms are not incorporated into the roomblock during this period but lightly constructed shelters or ramada-roofed activity areas often are. Pithouses remain the primary residence and are generally located to the south of the roomblock.

Pithouse Architecture

Pithouse architecture undergoes subtle changes in form and superstructure including the introduction of a four post support system, along

with a more square pit outline (Figure 118). The slab-lined vent shaft is often replaced by a small bulb-like recess that extends southeast at the level of the floor. What doesn't change is also worth commenting on: the distinctive pattern of floor features that first appears during Pueblo I times are very similar during the early Pueblo II period - a continuity that persists for over three hundred years.

At odds with the above description is the pithouse at 42Ka6043 (Figure 88) recently excavated along Kanab Creek (Nash 2013). This structure is relatively deep with a vestigial bench and posts incorporated into the plastered walls. It was built very late in the period and may reflect the beginning of architectural influences that appear during the succeeding Late PII Period.

Projectile Point Styles

Parowan Basal-notched projectile points are the dominate type during the Early Pueblo II Period. While similar to the Fremont style, no cultural connection is inferred. A review of Pueblo I point styles (Figures 47, 54) suggests a continuity of form that continues into the 13th century (Figure 106).

Mortuary Practices

There is no local evidence for the manner, preferred location, or methods of interment during Early Pueblo II times. This is generally true for the BMIII and PI periods as well. A notable exception is the extended remains of an elderly female on the floor of the BMIII pithouse at 42Ka4280. Given the amount of excavation on sites of these periods, the negative evidence seems to indicate interment off-site. A single example of an isolated burial is reported from Parunuweap area that was accompanied by a St. George Black-on-White vessel (Matthew Zweifel personal communication 2012)

Discussion

The Pueblo II period, its definition and time span, is arguably the most significant - and problematic - period in the Virgin sequence. Investigators have defined the term in several ways. Fairley (1986) subdivides Pueblo II into three units Early, Middle and Late (Figure 3). Her criteria are ceramic types found in the Kayenta - but not in the Virgin. Thompson (1986:357) also describes

three subdivisions based on ceramic distinctions: early and late PII are essentially the same as those presented here. However, Thompson also includes a short period A.D.1050 to 1075 that was identified with collections that display both North Creek Corrugated and St George B/G. This transitional period, while logical, has not been identified on the Grand Staircase.

The attempt in this temporal framework is not to postulate logical subdivisions, but to organize diagnostic material culture into recognizable and useful temporal units. Hence, a period that crosscuts the introduction of a significant ceramic type, such as corrugated grayware (as does the Arizona, Strip chronology), is not considered appropriate. Although fine temporal distinctions based on the slow change of ceramic assemblages within the Pueblo II period may eventually be defined and dated, at this point, they appear to be logical constructs rather than demonstrated. The division of Pueblo II into early and late presented here not only has considerable supporting data, but also very significant implications for social change. At any rate, there simply is no evidence for an intermediate, ceramically defined period on the Grand Staircase. The cautious path would be to retain the simple two part division until such a period is defined.

One of the most critical chronological junctures in the entire Virgin sequence is the termination of the Early Pueblo II period and the dating of the late PII horizon which is marked by the introduction of exotic material culture - sometimes termed the "Pueblo II expansion." If the juncture is abrupt, as it now appears, we might infer migration; if it is drawn out with transitional ceramic assemblages as Thompson suggests, it may be a result of diffusion. Because terminal early Pueblo II dates lack precision (Figure 116) this brief window of time should be the focus of future dating efforts.

The Early Pueblo II Period may be viewed as the end of a long conservative sequence that began during Basketmaker III times and was largely unaffected by people and events south of the Colorado River until sometime between A.D.1050 and A.D. 1100.

Late Pueblo II

A. D. 1050/1100 to 1150

The traditional late Pueblo II designation is retained, not only out of convention, but because it dates the introduction and intensive use of a constellation of traits identified with "the Pueblo II expansion" - a phenomena described throughout the Colorado Plateau and one worthy of dating as precisely as possible. Although the sequence of radiocarbon and tree-ring dates continues into the 13th century (Figure 119), a terminal date of A.D. 1150 is retained based on the absence of Pueblo III ceramic types.

Ceramics

Late PII ceramics in the Virgin area closely parallel those found in the northern Kayenta area during the Kletthla Phase, A.D.1090-1170 (Ambler 1985). White wares include Black Mesa, Sosi and Dogoszhi, and rarely Flagstaff design styles on locally made North Creek and Shinarump wares. Tsegi Orange Wares (TOW) include; Medicine Black-on-Red, Tusayan Black-on-Red, and both Citadel and Tusayan polychromes in low frequencies. Local versions of both Tusayan and Moenkopi Corrugated, dominate the gray ware category.

Recent revisions of the local red ware classification now consider Middleton Red Ware part of the Shinarump Series rather than the Little Colorado Series of San Juan Red Ware (Collette 2009). Based on the physical characteristics, the revision is considered long overdue by most researchers in the region. It also has significant implications for both dating and intra-regional relationships.

The production area for the Shinarump Red Ware (SRW) is proposed to be along the base of the Vermilion Cliffs on both the Grand Staircase and on eastern Arizona Strip along the base of the Paria Plateau (see Appendix D). Shinarump Red Ware types are considered cognates of the Tsegi Orange types listed above (Allison 2007). Assuming the design styles are derived from TOW, they logically postdate it and offer a possible means of dating (Figure 120). There is mounting evidence that Tsegi Orange Ware is the dominant red ware during the first decades after A.D. 1100; after A.D.1150 Shinarump Red Ware percentages approach 90% (Appendix D, Table 2).

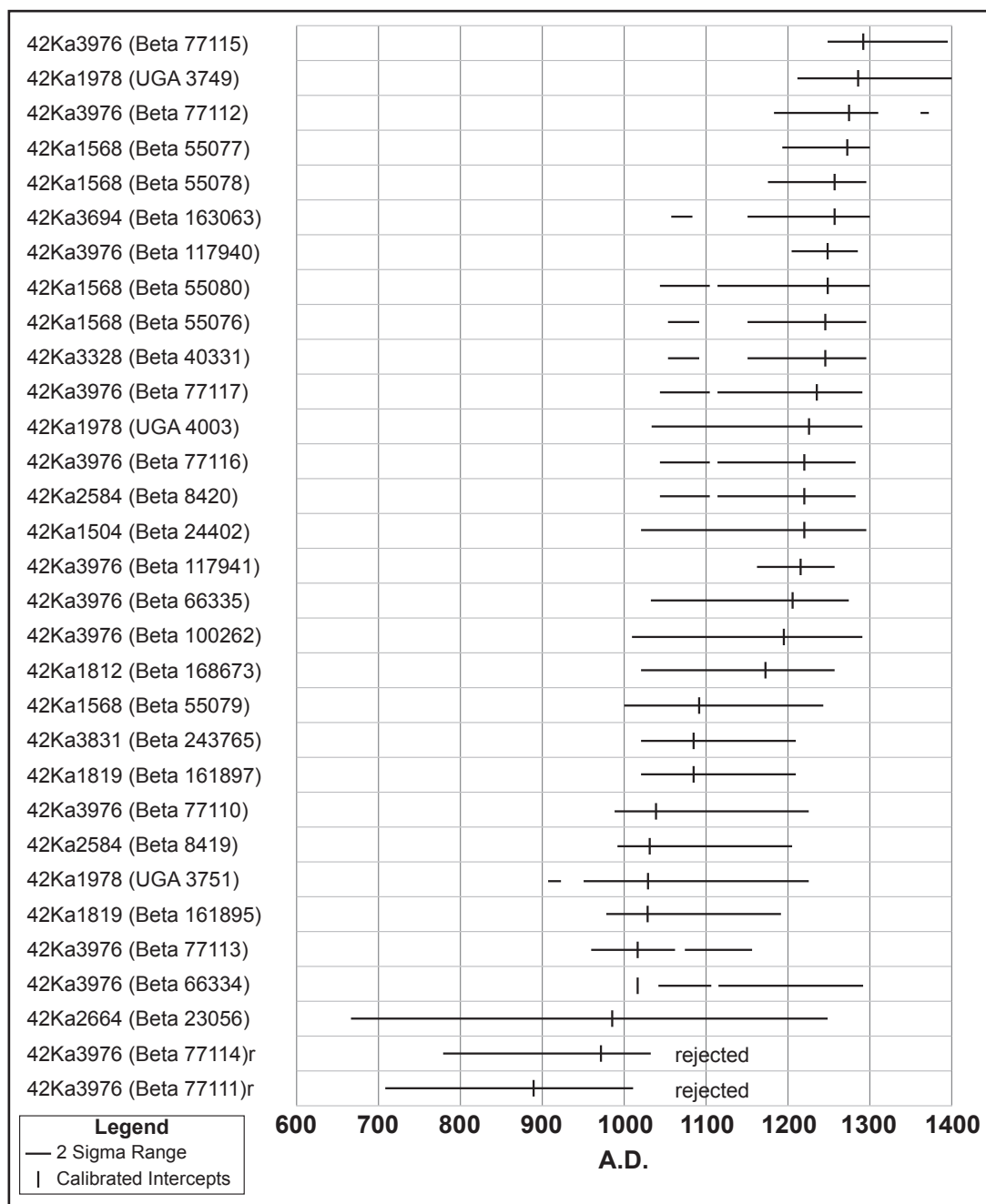


Figure 119. Array of selected radiocarbon dates from the Grand Staircase (Late Pueblo II - Pueblo III).

Site #	Laboratory #	C 13/12	Material	BP age	2 Sigma Range	Cal. Curve
42Ka3976	Beta 77110	-	Charcoal	950+/-60	AD 990-1225	AD 1040
42Ka3976	Beta 77111	-	Charcoal	1150+/-70	AD 705-1020	AD 890
42Ka3976	Beta 77112	-	Charcoal	760+/-60	AD 1180-1310 AD 1365-1375	AD 1275
42Ka3976	Beta 77113	-	Charcoal	1020+/-50	AD 960-1065 AD 1075-1155	AD 1015
42Ka3976	Beta 77114	-	Charcoal	1110+/-70	AD 780-1035	AD 970
42Ka3976	Beta 77115	-	Charcoal	700+/-50	AD 1250-1395	AD 1290
42Ka3976	Beta 77116	-	Charcoal	840+/-50	AD 1045-1105 AD 1115-1280	AD 1220
42Ka3976	Beta 77117	-	Charcoal	820+/-80	AD 1045-1105 AD 1115-1290	AD 1235
42Ka3976	Beta 66334	-	Charcoal	1020+/-50	AD 1045-1105 AD 1115-1290	AD 1015
42Ka3976	Beta 66335	-	Charcoal	860+/-50	AD 1035-1275	AD 1205
42Ka3976	Beta 100262	-	Corn cob	870+/-80	AD 1010-1290	AD 1195
42Ka3976	Beta 117940	-10.0	Charred corn kernel	800+/-30	AD 1205-1280	AD 1250
42Ka3976	Beta 117941	-9.2	Charred corn kernel	850+/-30	AD 1165-1260	AD 1215
42Ka1978	UGA 3749	-	Charcoal	720+/-65	AD 1215-1400	AD 1285
42Ka1978	UGA 3751	-	Charcoal	980+/-75	AD 905-920 AD 950-1225	AD 1030
42Ka1978	UGA 4003	-	Charcoal	835+/-65	AD 1035-1290	AD 1225
42Ka1568	Beta 55076	-10.0	Maize	810+/-60	AD 1055-1090 AD 1150-1295	AD 1245
42Ka1568	Beta 55077	-9.6	Maize	770+/-50	AD 1195-1300	AD 1270
42Ka1568	Beta 55078	-	Charcoal	790+/-50	AD 1175-1295	AD 1260
42Ka1568	Beta 55079	-	Charcoal	930+/-60	AD 1000-1245	AD 1055, 1090, 1150
42Ka1568	Beta 55080	-	Charcoal	800+/-70	AD 1045-1105 AD 1115-1300	AD 1250
42Ka3328	Beta 40331	-	Charcoal	810+/-60	AD 1055-1090 AD 1150-1295	AD 1245
42Ka2584	Beta 8419	-	Beam 7-9cm	960+/-50	AD 995-1205	AD 1035
42Ka2584	Beta 8420	-	Burned Beam	840+/-50	AD 1045-1105 AD 1115-1280	AD 1220
42Ka2664	Beta 23056	-	Charcoal	1080+/-140	AD 665-1250	AD 985
42Ka1504	Beta 24402	-	Charcoal	840+/-80	AD 1020-1295	AD 1220
42Ka3694	Beta-163063	.25.7	Twig in adobe	780+/-70	AD 1060-1080 AD 1150-1300	AD 1260
42Ka3831	Beta-243765	-8.5?	bone	920+/-	AD 1020-1210	AD 1060, 1080, 1150
42Ka1812	Beta-168673	?	Riparian twig	980+/-60	AD 1020-1260	AD 1170
42Ka1819	Beta-161895	-8.4	Corn cob	980+/-60	AD 970-1190	AD 1030
42Ka1819	Beta-161897	-21.1	Post bark	920+/-40	AD 1020-1210	AD 1060,1080, 1150

Table 23. Radiocarbon Dates from the Grand Staircase (PII-PIII).

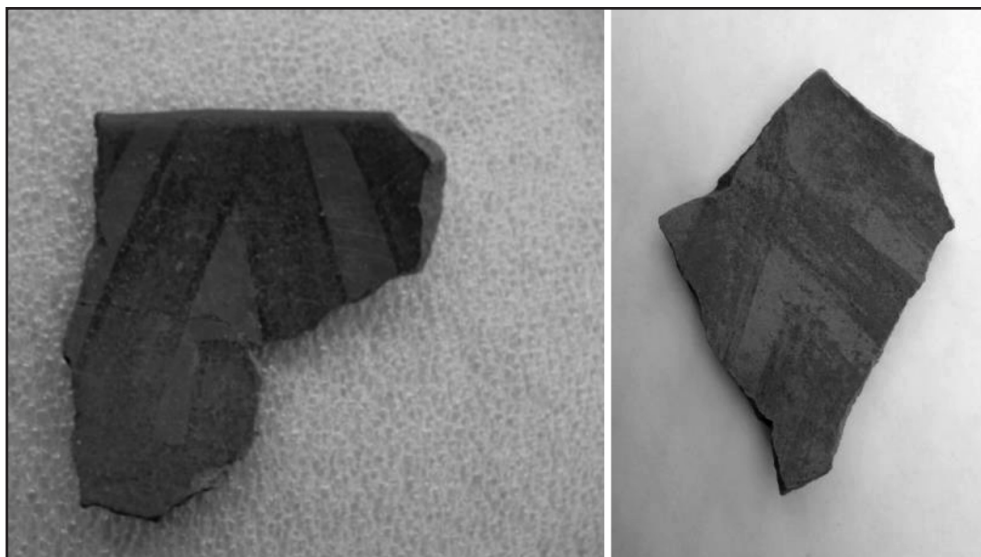


Figure 120. (Left) Citadel Polychrome (Tsegi Orange Ware) sherd from 42Ka1504 tree-ring dated about A.D. 1100; (Right) Nankoweap Polychrome (Shinarump Red Ware) from Trench 91-1 42Ka1576 dated post A.D. 1200.

Masonry Surface Architecture

Masonry rooms and roomblocks are the most visible architectural hallmarks of the Late Pueblo II Period. Several dated examples from Kanab Creek/Cottonwood Canyon are considered the type sites for the period (Figures 72, 78, 79, 82, 90). The “L” shaped pueblo, a structure designed and constructed as a unit, also appears to be introduced at the same time. The best defined examples of this type are found in House Rock Valley (Figure 121). While good examples of this type have been identified from surface indications on the Grand Staircase, at least some were constructed – or reconstructed, room by room in traditional Virgin fashion (Figure 109). Local examples of pueblos that may have been initially laid out as “L” shape include: Corn Grower (Figure 94), 42Ka1813 (Figure 96), and West Bench Pueblo (Figure 97).

Another structural form introduced during the Late Pueblo II Period is a small north-south oriented roomblock measuring about 8m x 2m. These structures may represent storage, habitation or both; they occur as both the primary feature on site and as ancillary roomblocks on larger sites. Although none have been excavated, they appear to be built as a unit using the “ladder” construction method of laying out the long walls first and then adding partitions (Cameron 1999). An example of the method in the Escalante area is the storage roomblock of Structure A at the Coombs site (see

Figure 160).

Although the primary function of roomblocks, both masonry and jacal, was for storage, residential rooms with hearths were often incorporated into them during this period (Figure 56). In addition to roomblock residences, it is also common for Late PII sites to have fully subterranean masonry-lined pitstructures located to the southeast of the roomblock. First identified as kivas by Judd (1926), their function as true kivas or winter residences remains an open question.

The “Kiva”

Aikens (1965) puzzled over the difference between a pithouse and a kiva at Bonanza Dune. After excavating several early benched pithouses that held formally patterned, clay-lined, sand-filled basins – which he suggested had ceremonial significance, he found no such features in the fully subterranean masonry structure he called a kiva (Aikens 1965:28). The occurrence of kivas in the Virgin culture area is a subject of interest because they represent both an exotic introduced architectural form as well as having social/ideological implications. Their presence or absence would seem to be excellent evidence for the nature of contact with the Kayenta region.

Kiva Distribution. The best documented masonry-lined, subterranean pitstructures in the Virgin region are at: 42Ka1504 Judd’s Cave 6, located in Cottonwood Canyon (Figures 73, 74); 42Ka1812

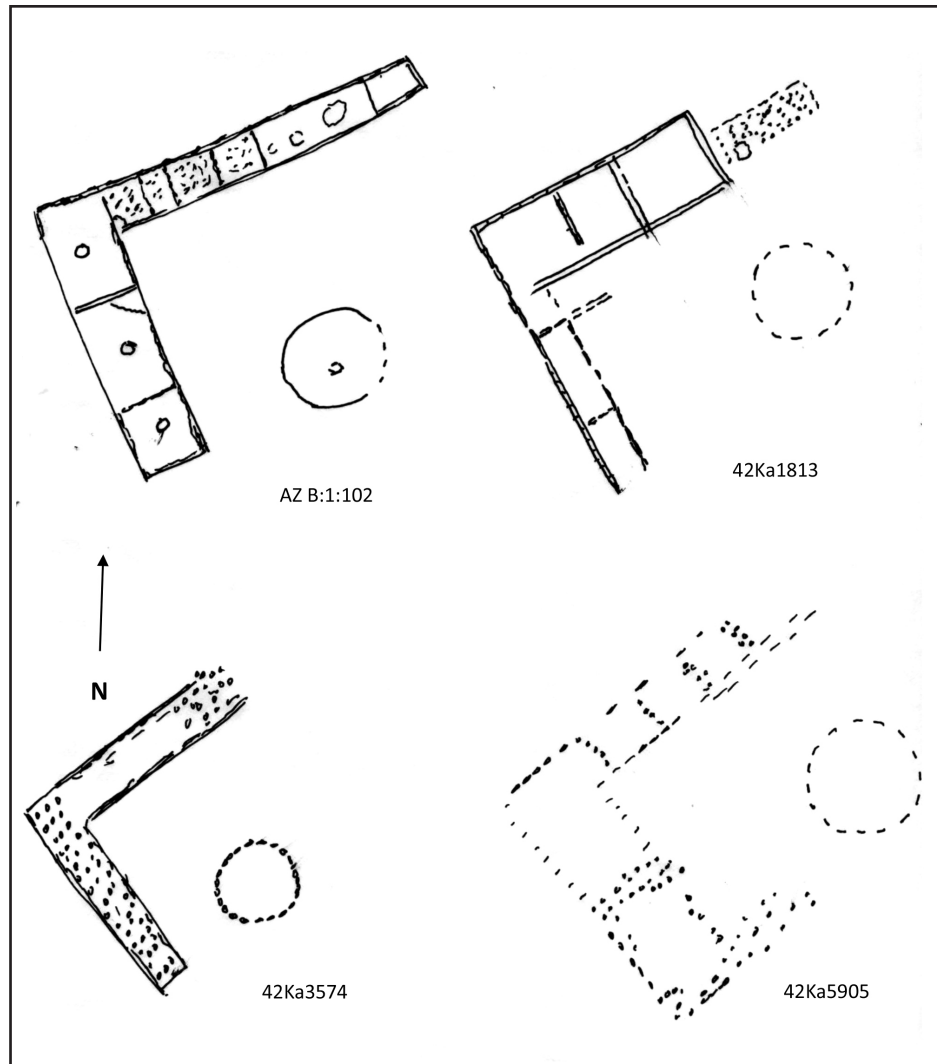


Figure 121. "L" shaped courtyard pueblos.

(Kiva Cave) also in Cottonwood Canyon (Figure 77); the Corn Grower site, Az B:1:102, (Figure 95); 42Ka1819 in a tributary to Kanab Creek (Figure 83); two fully subterranean masonry structures in Johnson Canyon, one at Bonanza Dune (Aikens 1965) and the other near its confluence with Flood Canyon 42Ka3574 (IMACS records).

The furthest west reported kiva occurs at 42Ws920, on Little Creek Mt. where an example of a Pueblo I pithouse being remodeled into a "kiva" is reported by Walling - Frank (personal communication 2014). In this instance, the bench of a slab-lined, Pueblo I pithouse was used as a platform for a masonry wall. The coursed masonry above the slabs provided a continuous interior face similar in appearance to traditional kiva construction. The remodeling event on this

complex, multicomponent site (called "Mixmaster" by Richard Thompson) occurred during Late Pueblo II times. It may represent a true kiva or simply an attempt to conform with the new pit structure style.

Two examples of masonry pit structures located on the west end of the Grand Staircase are known. Neither have not been excavated or directly dated: one was described at 42Ka1568, Pottery Knoll (Figure 102); the other, 42Ka3054, was recorded along the Shinarump Cliffs overlooking Seaman Wash.

Distinctive kiva features are few, inconsistent, and ambiguous (Figure 122): Aikens reports loom anchors at Bonanza Dune; at 42Ka3576, a small square niche was constructed in the masonry wall; 42Ka1504 had a benched recess located on the north side of the structure. Nearly all these structures have

slab-lined hearths and narrow vent shafts on the south quadrant- Judd's Kiva Cave is a good example (Figure 122). With the possible exception of a single floor pit at Corn Grower, the sand-filled pits of the early Puebloan periods are not known.

General construction techniques and dimensions of kivas are quite consistent. Where known, depth approaches 2 meters; shape is circular, sometimes sub-circular, diameters are less than 5 meters for most, but note that Corn Grower is unusually large at about 6 meters in diameter. Masonry techniques are not particularly sophisticated; coursing is rarely bonded and is often little more than stacked tabular sandstone with plaster invariably covering the rough masonry. Posts are often incorporated into the walls. Judd thought they functioned as roof supports, most seem too small for the purpose. In some cases masonry laid up against the posts seems to result in the "stacking" effect (Figure 122).

Fully subterranean, earthen, pit structures have a similar distribution as masonry-lined structures. Their dimensions and features are similar but because virtually all examples of the type are dated post A.D. 1150, they are described in the Pueblo III section of this volume.

Dating. Ceramic cross-dating, a few radiocarbon ages, and tree-ring dates place the introduction of the masonry-lined, subterranean pit structure around A.D. 1100. Its introduction coincides with a constellation of material culture traits and architecture associated with the Pueblo II "expansion." Charcoal in the hearth at 42Ka1504 provided a conventional date of 840 B.P. (Beta-24402) which is very close to the suite of tree-ring dates collected from the surface of the site. Two non-cutting dates from the Corn Grower pit structure suggest it was constructed about A.D. 1150 or shortly after.

Discussion. Judd considered the deep, masonry-lined, subterranean rooms to be kivas based on their similarity to structures reported in the Four Corners area by Kidder and others. In the context of his work in Cottonwood Canyon, they were an obvious shift from the shallow, benched, slab-lined pithouses that clearly preceded them. Although absolute dates are few, construction of the masonry-lined kiva may have spanned no more than a few generations from about A.D. 1100 and A.D. 1150. Their distribution is limited to the Grand Staircase, none are known from the Kaiparowits or Paria Plateaus. On the

Grand Staircase deep, earthen, pit structures, often present on late sites, seem to replace them. In these contexts, however, their function as ceremonial chambers is doubtful. No deep subterranean pit structures are reported from the St. George Basin during the Late PII period. In fact, after A.D. 1100 pithouses of any sort are not known to occur. It is possible that, after its initial introduction on the Grand Staircase, the masonry kiva may have eventually come to play a more secular role as a winter residence in the uplands. Fully subterranean rooms are cramped and uncomfortable, but well suited to occasional subzero temperatures in the region. Earthen pit structures seem to play that role during Pueblo III times.

The switch from shallow, benched pithouses with a very standardized set of floor features, to deep masonry subterranean rooms with none, is clearly a transformative shift in local settlement sequence. Demonstrating that the new structures were in fact kivas, with attendant ceremonial functions that the local population adopted, will always be equivocal. A stronger case for such a shift in worldview can be made based on the local population apparently abandoning the long-held traditions involved with the old style pithouse. While based on negative evidence, it might be argued that abandoning old traditions is every bit as significant as adopting new, exotic, ones.

Masonry Techniques

Steward recognized the transition from circular, slab-lined, adobe walled structures - some with rudimentary masonry (such as his Site 2, see Figure 58) to true masonry as a hallmark of the latest building style, as well as "influence from Tusayan Pueblo II" (Steward 1941:292). Apart from granaries in protected shelters, the best examples of masonry come from the Kanab Creek and Cottonwood Canyon drainage system (Figure 123). The quality of workmanship is difficult to compare with other areas, but seems to be highly variable. This may be due in part to the nature of the building stone, expertise and care exercised by the mason, or function of the structure. In some cases, upright slabs continue to line room interiors and "kivas", but not in all cases. Evenness of coursing, usually one stone thick, and the amount of mortar used is variable. Spalls are sometimes inserted into mortar, leveling courses are often erratic, bonding of

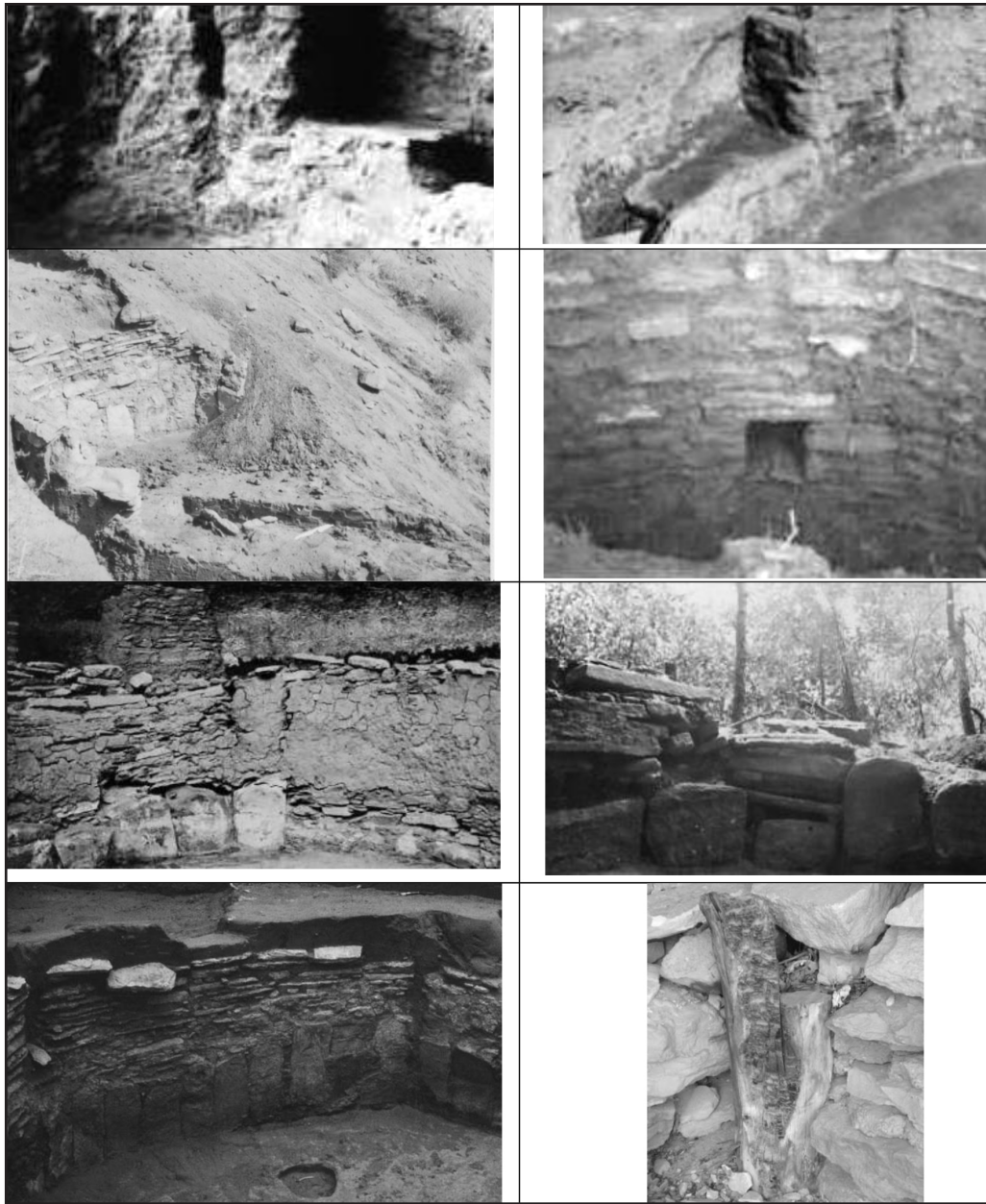


Figure 122. “Kiva” feature details; from top, left to right; Cave 6, (42Ka1504), view of recess, “pilaster” and post impression on west; view on east - note earlier pithouse floor cut by the kiva excavation; Bonanza Dune 42Ka1076) note slab uprights; 42Ka3574, Johnson Canyon, note niche; Kiva Cave (42Ka1812) (Judd, 1926) note “baseboard” slabs; covered vent opening on south (Judd 1926); Corn Growers (AZ B:1:102) note stacked masonry and post impressions courtesy of B. Walling Frank; Trail Canyon Alcove (42Ka1819) post support in masonry wall.

adjoining walls ranges from overlapping to simply stacked. Plastering seems to vary according to room function, interior vs exteriors, and quality of masonry.

Examples of dry-laid masonry from the eastern Paria Plateau are impressive but are largely a result of excellent quality local stone and perhaps a lack of readily available clay (Figure 123). Dry-laid masonry holds up to the weather better than

masonry with copious amounts of mortar. Even with high quality stone available, masonry on the Paria Plateau does not appear to reach the standards of PII/III architecture east of the Colorado River.

Although few in number, examples of roofing techniques seem not to have changed from early Pueblo II times (Figure 62, 85). Beams were overlaid by twig-sized closing material, sometimes woven between the beams. Juniper bark was

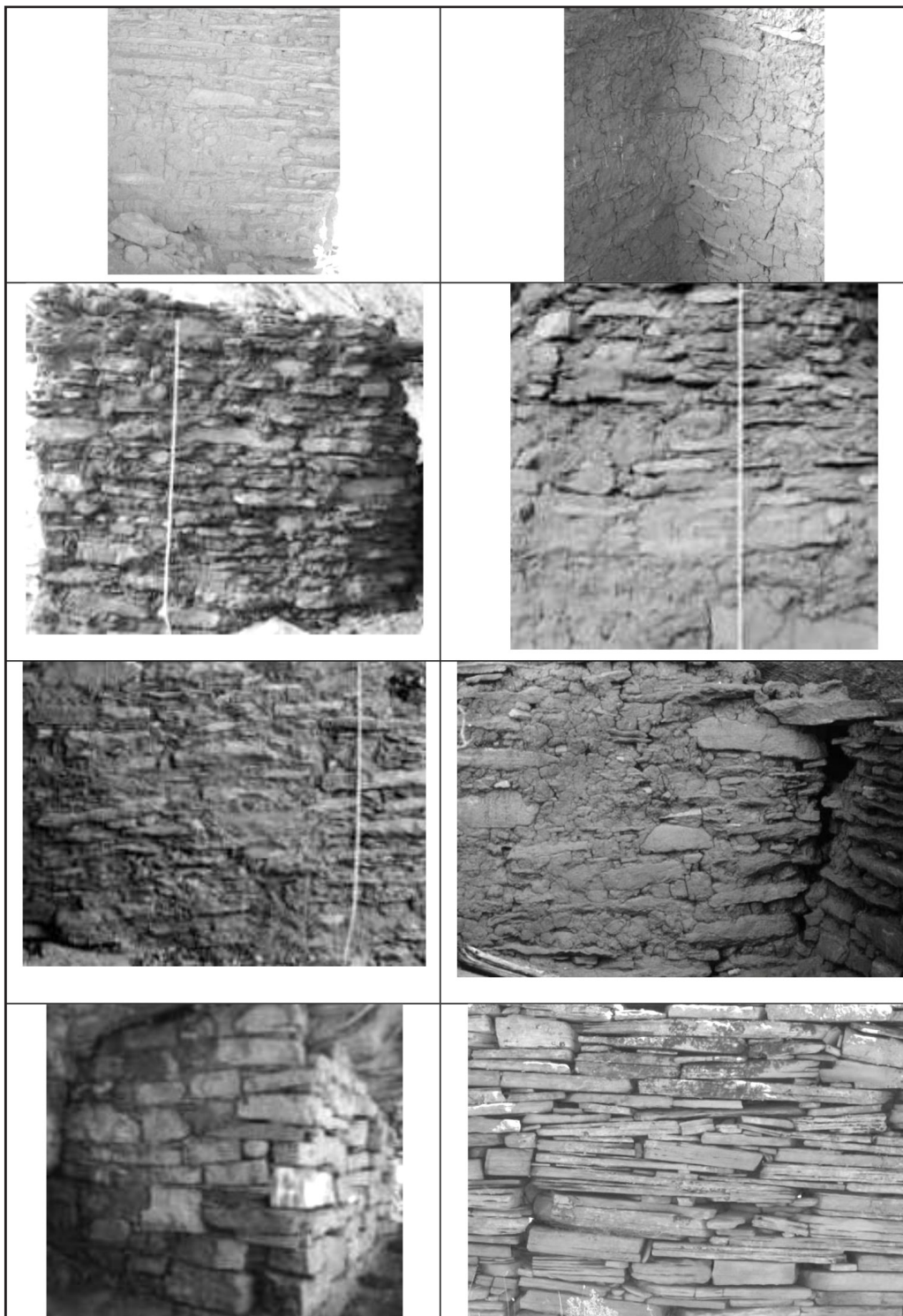


Figure 123. Examples of Late PII masonry (from top, left to right): Trail Canyon Alcove, (42Ka1819), exterior, west room; interior corner west room; Kiva Cave, (42Ka1812), Room 3 exterior view of east wall, (42Ka1812) Room 4, (42Ka1812) Room 2; (42Ka1698), West Room; Glass Eye Granary, (42Ka1557); AZ: C:1: 6 (BLM) Paria Plateau.

then placed on the closing material and overlaid with puddled adobe. In some cases tabular stone protected the adobe. What appears to be an innovation during late PII times is the method of sealing the entryway. Granaries during the earlier periods had a slab placed against a well-formed clay coping and apparently sealed with adobe clay – in this regard, granaries are really just upright cists. In contrast, Late Pueblo II rooms typically have small holes on each side of the entry, presumably for loops in which to insert a stick to hold the slab against the opening. Judd commented on these features at Cave 6 (Judd 1926). It seems likely that granaries, usually isolated and only used intermittently were sealed for a period of time, while storage rooms on habitation sites required more ready access.

The technique, quality, and variability of masonry in the study area deserves additional study. In general, however, it does not give the impression of skilled immigrant masons, but rather local attempts at emulation. Future comparative analysis with masonry on Fiftymile Mountain and elsewhere in the eastern Virgin region might be productive.

Artifacts. Both chipped and groundstone assemblages also vary from the early Pueblo II period. The trough metate becomes rare (but possibly curated) and the shallow block metate seems to replace it. Bull Creek projectile points are introduced and account for up to 50% of the arrow points on the east of Kanab Creek. Traditional Parowan Basal-notched points continue to be the most common but with only slightly higher frequencies. An analysis of Bull Creek point frequency on sites further west on the Grand Staircase and into the St George Basin might be a useful measure of “eastern” influence.

Rock Art. The Eastern Kayenta style, described by Schaffsma (1971) for the area east of Kanab Creek, may coincide with the late Pueblo II period and support the notion of migration from east to west. 42Ka1521 is a good example of this style that occurs in Deer Springs Wash. Initially recorded by Steward (1941), 42Ka1521 probably dates to the Late Pueblo II period. The geometric forms characteristic of this style appear have no antecedent styles in the Virgin area and are similar to those found in House Rock Valley (Figure 124).

“The Pueblo II Expansion.” Does the definition of a Late Pueblo II period dominated by material culture traits that originate in the Kayenta result from the diffusion of ideas, or the migration of people?

The dating and demographic (Figure 6) evidence presented earlier argues for a sudden influence that may be explained by actual population movement similar to the scenario presented for Kayenta migration up the Escalante River and also onto the Kaiparowits Plateau (Lister 1964; Fowler and Aikens 1963). In a discussion of population dynamics during the twelfth century Lyneis (1996:11) points out that “the area east of the Kanab Creek drainage seems to show the effects of the Kayenta expansion that began around A.D. 1050, resulting in the establishment of Kayenta populations in the Kaiparowits and Paria Plateaus, the Inner Canyon, and Walhalla Glades.” In this light, the Virgin Late Pueblo II period is very much a manifestation of the Pueblo II “expansion.” Although it is possible that the actual migration of people was small, its effect through diffusion of material culture was felt in various degrees throughout the Virgin culture area.

On the other hand, Aikens (1965) suggested that (late) Pueblo II expansion was not a result of population movement, but simply a result of in situ growth (Aikens 1965:56). His view still has merit – depending on how “in situ” is defined. Large scale Pueblo II expansion has important implications for demographics and even abandonment of the Virgin area. Rather than being just a hackneyed cultural-historical term, population pressure caused by expansion could have had a dramatic effect of on the subsistence base of the Grand Staircase and consequently the entire adaptive system. (In this sense, however, it doesn’t matter who expanded the population – just that it happened.)

Expanding on Aikens’ observation that the expansion was internal, recent inventory and excavation on the Paria Plateau, House Rock Valley, and the Kaibab Plateau indicate that population growth there, along with the introduction of new agricultural techniques, and new forms of architecture – similar to those also found on the Grand Staircase, may have occurred at about the same time, circa A.D. 1050-1100 (McFadden 2004, 2008, 2010). Considering cultural affiliation of material culture on the Eastern Arizona Strip: the pottery is predominately Virgin, that is, a mix of Shinarump and Virgin Series; projectile points include both Virgin Parowan Basal-notched and Kayenta Bull-Creek types. As pointed out by researchers very familiar with Kayenta architecture, the “L” shaped courtyard pueblo has no precedent



Figure 124. Examples of rock art from the eastern portion of the Grand Staircase (after Steward 1941).

in the Kayenta region and mealing rooms that are common there, are not known to occur north of the Colorado River (Geib et al. 2001). Based on these data, it seems clear that consideration of the Virgin Anasazi on the Grand Staircase would benefit from a landscape approach that includes the eastern Arizona Strip

Dating. Based on sheer number of tree-ring and radiocarbon dates, late Pueblo II should be the best dated period in the Virgin sequence. Unfortunately, ascertaining when the initial introduction of late ceramic types took place and the length of time it took for them to become popular remains less than precise. The early Pueblo II Kanab site, dated by Nickens and Kvamme (1981) with an uncalibrated average of two C14 assays, suggests the on-set of late PII just prior to A.D. 1100. Ambler (1985) places the introduction of the late PII ceramic assemblage at about A.D.1050. Tree-ring dates from

the Cottonwood Canyon area (42Ka1504) suggest that the Late Pueblo II architectural and ceramic complex was in place by A.D. 1100. At present this is the best approximation for the beginning of late Pueblo II. Clearly, many more dates are needed to narrow the gap for this critical horizon.

Based mainly on ceramics, A.D. 1150 is traditionally cited as the terminal date for the Virgin region (Aikens 1966). In the absence of chronometric dates, this was a valid assumption: the latest ceramic types present in the culture area; Flagstaff Black-on-White, Tusayan Black-on-Red, and Citadel Polychrome - all date to the Klethla Phase prior to A.D.1170 (Ambler 1985:68). No Kayenta Pueblo III ceramic types, other than a stray sherd here and there, are documented in the Virgin culture area. Although Virgin occupation continues into the 13th century, the A.D. 1150 date is retained here for the end of the Late Pueblo II period because it marks the end of external influence. The Kayenta influence that characterizes the Late Pueblo II period appears to have lasted less than 100 years - possibly as few as 50 years.

Pueblo III A. D. 1150 to 1250 +

Aikens (1966:56) placed the terminal Virgin date at A.D. 1150. There was no ceramic cross-dating evidence to suggest that occupation in the Virgin area continued beyond that date - and there still isn't. Richard Thompson, excavating at Tuweep, provided the initial evidence for the continuation of Virgin occupation beyond A.D. 1150 (Table 13). Thompson's late dates were met with skepticism; since then a growing number of radiocarbon dates have been reported that support occupation well into the thirteenth century (Table 23, Figure 119).

Recognition of a 13th century occupation for the Virgin culture area, even if (especially if) its material culture doesn't seem to differ from the earlier period, is a challenge that has only recently been addressed. The apparent lack of material culture change after A.D.1150 is an extremely significant comment on both culture contact and internal conservativeness. Obviously, what is needed to confirm a Pueblo III age occupation are independent dating methods. In the absence of tree-ring dates beyond A.D. 1150, radiocarbon dates at least confirm a PIII presence. Luminescence and archeomagnetic dating also have

potential could also provide independent dating in some situations.

A third dating possibility involves determining ceramic frequencies of temporally sensitive wares. Corrugated-plain grayware frequencies have been employed by Thompson (1986), Allison (1998), and Lyneis (2011) to provide relative dates on the western margin of the Virgin region. On the Grand Staircase the shift from plain to high frequencies of corrugated grayware appears to have occurred too rapidly to be useful for dating. For example, at the early PII farmstead 42Ka 6293 along Kanab Creek, dated to about A.D. 1050, there is no corrugated pottery; at 42K1504, dated about A.D. 1100, corrugated pottery accounts for 62% of the total grayware assemblage; North Creek Corrugated accounts for 56% of the Virgin Series (which includes probable mixing with a Pueblo I component) while corrugated pottery accounted for 74% of Shinarump Gray Ware.

Richard Thompson's analysis of over 30,000 sherds from the Corn Grower site on the bank of Short Creek suggests that by Pueblo III times over 75% of the gray wares were corrugated (Thompson N.D.) As regards red wares in this large sample, 95% were Shinarump Red Ware series while only 5% were Tsegi Orange Ware. (Access to this large database, summarized by David Van Alfen, was made available by Barbara Walling Frank of the Southern Utah University Archeological Repository.)

Lyneis (2011) and Allison (2007) have also described the temporal significance of different red ware frequencies. While this approach appears to have merit, their occurrence are the result of imperfectly understood historical processes that may vary due to a variety of spatial and temporal factors. For example, in the eastern Virgin region the appearance of San Juan Red Ware during the early periods, its replacement with the introduction of Tsegi Orange Ware by A.D. 1100, and the local production of Shinarump Red Ware sometime after, appears to be a particularly useful sequence. By A.D. 1150 Shinarump types account for some 90% of the red wares (Appendix D, Table 2).

As mentioned earlier, in terms of material culture diagnostics, the Pueblo III period is essentially "silent" and indistinguishable from the preceding Late Pueblo II Period. What makes this period particularly interesting is the lack of late diagnostics i.e. Tusayan, Betatakin, Kayenta and Wapatki Black-

on-White ceramic types. The interpretation of this situation as a "return to normalcy" is tempting: After a brief period of intense external influence beginning around A.D. 1100 or just before, lasting only a few generations, the Virgin population assimilated the exotic traits and continued on their original adaptive path established hundreds of years before.

Evidence for Virgin PIII Occupation

In support of an occupation lasting 50 to 100 years or beyond A.D. 1150 is the sheer quantity of ceramics and depth of midden noted on many Late Pueblo II sites on the Grand Staircase. This phenomena was noted on surveys during the 1980's and 1990's at numerous sites in the Seaman Wash, Fin Little, and Kitchen Corral inventory areas where it seemed incredible that the amount of trash observed could have accumulated within the eighty or so years allotted for the Late Pueblo II period. From a quantitative standpoint, it may be possible to identify temporally sensitive local variations of ceramic styles, or perhaps assemblages of types or wares, but this might prove to be difficult. For the time being, the best means of identifying a potential Pueblo III occupation is relative - sites with deep or extensive middens displaying large quantities or high percentages of Moenkopi style corrugated grayware, Sosi, and Dogoszhi white wares and either local or intrusive red wares/polychromes could easily date to the late 12th or early 13th century.

Note: Since the above was written in 2000 it has become apparent, as discussed elsewhere in this volume, that corrugated/plain gray percentages and high frequencies of redware are indicative of post A.D. 1150 occupation. Since their introduction just prior to A.D. 1100 corrugated frequencies steadily increase from just over 60% of grayware at 42Ka1504 to 86% during the A.D. 1200's at both Gnatmare and the Arroyo site. Tsegi Orange ware, the sole redware type at 42Ka1504 (Wilson 1989) appears to be almost entirely replaced by locally produced Shinarump Red Ware after A.D. 1150 (see Appendix D).

Earthen Pit structures

Like the earlier masonry-lined "kivas", floor features in earthen walled pit structures are minimal. Tunnel vent shafts occur on the southeast. Hearths are either slab-lined or clay-coped. Deflectors are

known from only Pit Structure 4 at the Arroyo site. Pits, bins, or other floor features have not been identified. While they are fully subterranean, they are rather small at four meters or less in diameter.

Examples of earthen or partially masonry-lined, fully subterranean, pit structures include: Pit Structure 13 at the Late PII component of the Reservoir site (Walling-Frank 1998); two earthen structures at the 42Ka3976, Arroyo Site (McFadden 2012); and 42Ka1978, the Gnatmare site (Metcalf 1981). Radiocarbon dates for these sites place them in the thirteenth century. An undated deep pit structure, located along Kanab Creek near the Southern Utah University Archaeological Field School excavations, was partially excavated at 42Ka3831 (McFadden 2006). High Shinarump Red Ware frequencies strongly associate with these late structures.

At this point, the only uniquely Pueblo III period architectural form to be dated is the deep subterranean pitstructure lacking floor features other than a hearth. Although they are similar to masonry lined “kivas” noted during the Late Pueblo II period, these earthen structures seemed have functioned as winter residences. Pitstructure 13 at the Reservoir Site in Colorado City, associated with a series of small storerooms, yielded a conventional radiocarbon age 670+/-90 B.P. (Walling-Frank 1998). At the Arroyo Site (42Ka3976) two very similar pitstructures; each with slab-lined hearths, one with a deflector, yielded 2 sigma range AMS dates on corn of A.D. 1205-1280 (Beta 117940) and A.D. 1165-1260 (Beta 117941) (Table 15).

The Eastern Virgin Landscape

It seems increasingly unlikely that the events and architecture of the Grand Staircase can be addressed without considering it in the larger context of the eastern Arizona Strip. Recent investigations on the Paria Plateau, House Rock Valley, and the Kaibab Plateau suggest that two pueblo layouts originate there: the “L” shaped courtyard pueblo described earlier in the Late Pueblo II section and the fully enclosed, plaza pueblo best known from the White Knolls locality of the Paria Plateau.

Pueblo Architecture

The “L” shaped, courtyard pueblo, best described in House Rock Valley (and also at the Coombs site, Figure 160) are considered formal

household units, consisting of both residential and storage rooms, each constructed in a single building episode (Figure 121). Frequently, the additional walls and rooms are added to form an enclosed plaza – a construction process that may extend into the Pueblo III times. Good examples of this type of growth are: West Bench Pueblo (Figure 97), Corn Growers (Figure 94), and 42Ka1813 (Figure 96). A significant distinction between a fully-enclosed courtyard pueblo and the true plaza layout is the shape and orientation of the household units that comprises the plaza and the construction method used to develop it.

As opposed to the “L” pueblo, consisting of one leg used for storage and at right angles another for residential rooms, the plaza layout consists of multiple “linear” household units. Each household unit consists of both residential and storage rooms aligned along a common wall. Passages may exist between the larger residential rooms but apparently not the smaller storage rooms. These structures occur as individual units and in combinations that fully enclose a plaza (Figure 125). The continuous front wall is a building attribute that appears to anticipate future construction in that it facilitates a continuous inner courtyard wall. AZ C:5:13 is presented as example of an unfinished plaza pueblo (Figure 125).

Paria Plateau Dates

No true plaza pueblos have been excavated or even tested on the Arizona Strip. As is the case over the entire eastern Virgin region, ceramic cross-dating of them is suspect due to complacency of the ceramic record. A single radiocarbon date from the plaza style pueblo AZ C: 5: 4 on the Paria Plateau yielded a 2 sigma date of Cal. A.D. 1170 – 1280 with an intercept of A. D. 1260 (Beta-260648) (McFadden 2010). An attempt to date plaza architecture on the Paria Plateau using luminescence dating on associated Shinarump Red Ware and a Washington Corrugated sherd was somewhat equivocal but suggested that plaza layouts may occur as early as A.D.1150 (Table 24). Because the luminescence dates are from sherds in surface contexts and, taking into account the possible lengthy occupational history of pueblos noted elsewhere, the luminescence dates should probably be considered no more than suggestive. The maize date, however, appears to be good evidence of occupation well into Pueblo III times.

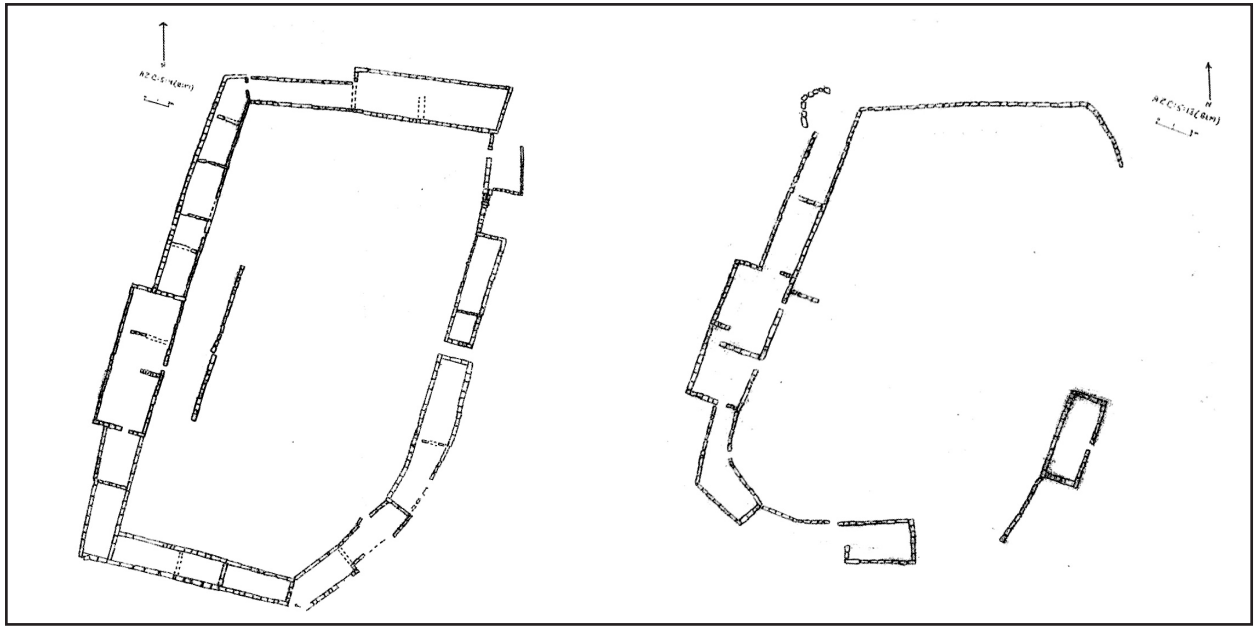


Figure 125. Plaza architecture on the Paria Plateau: left, AZ C: 5: 4 (BLM) ; right, AZ C:5:13 (BLM).

UW Lab #	Site	Sample #	context	type	Calendar date
UW283 8	Perfect Plaza AZ C:5:4	1	Residential room	Washington Corrugated	1140+/-60
UW283 9	Perfect Plaza AZ C:5:4	2	Sheet Midden	Nankoweap Polychrome	1160+/-60
UW284 0	South Butte AZ C:5:11	3	Courtyard	Shinarump Red Ware	1130+/-60
UW284 2	Yellow Butte AZ C:5:17	5	Courtyard	Nankoweap Polychrome	1060+/-340
UW284 5	White Butte AZ C:1:15	8	Midden/talus	Shinarump Red Ware	940+/-380
UW284 6	Bee Hive Bt AZ C:1:91	9	Darkened soil	Shinarump Red Ware Deadmans B/R?	920+/-80

Table 24. Luminescence dates from plaza pueblos on the Paria Plateau.

Grand Staircase-Kaiparowits Plateau Relationships

Sorting out the relationship between the Kaiparowits Plateau and the Grand Staircase populations has been a work in progress since Aikens (1965), Gunnerson, and Florence Lister (1964) first addressed the situation. The recent work of Geib and his associates make a good case that pottery there originates from the west (Geib et al. 2001). Supporting this scenario Geib points out that the architecture on the Kaiparowits Plateau bears no resemblance to that in the Kayenta region.

It is asserted here, however, that the architectural types and their patterning – at least on Fiftymile Mountain, is very unlike that on the Grand Staircase as well. The case for a specialized Virgin occupation on Fiftymile Mountain is described in the Kaiparowits section of this report. At any rate, to the extent the ceramic assemblages are the same in each area, the post A.D.1150 dates from Fiftymile Mountain give support to the apparent occupation of the Grand Staircase during Pueblo III times.

The Terminal Pueblo III

A characteristic of Virgin adaptation on the Grand Staircase, as a sub-area of the eastern Virgin region, appears to have been residential mobility, but always within the agricultural zone and rarely pushing the limits of elevation and adequate precipitation. On the eastern Arizona Strip, after A.D. 1100, there was expansion into areas previously only lightly inhabited. New agricultural niches were farmed and new forms of agricultural intensification were adopted. Two cases in point are: the intensive field house systems on the eastern Paria Plateau clustered around high elevation basins; and, the extensive agricultural terraces, check dams and field houses in House Rock Valley and Saddle Mountain. Both were designed to exploit two very different hydraulic settings (McFadden 2004, 2008, 2010). These agricultural systems are not known on the Grand Staircase; there, shifting among existing farmsteads, a behavior suggested by the sequential episodes of site occupation, seems to have continued to be the strategy for dealing with the vicissitudes of agriculture in a variable climate. This suggests a hypothesis for abandonment or at least depopulation of the eastern Virgin area based on local population dynamics: as the more specialized strategies on the eastern Arizona Strip declined or failed, resulting in population movement to the Grand Staircase, the multiple farmstead strategy there may have become untenable. If access to various farming niches was limited by population pressure, a climate downturn might have been catastrophic.

The implication here is that if the entire eastern Arizona Strip and Grand Staircase region was part of the same interaction sphere – as indicated by a common ceramic tradition, a broader landscape-based context for viewing the events of the thirteenth century and eventual depopulation process may be necessary. At this point, the radiocarbon dates from the Grand Staircase, the single date on maize date from the Paria Plateau, and both radiocarbon and tree-dates from Fiftymile Mountain, extend the occupation of all of these areas to at least the early to middle thirteenth century.

The Post-Formative Period

Based on the existing chronological record, the Pueblo III period on the Grand Staircase ended sometime during the mid to late A.D. 1200's. Some have asserted that it coincided – or was actually

caused by, the “great drought” beginning A.D. 1270's (Larson et al. 1996). High population levels, an extreme local climate downturn, changes in adaptive behavior supporting this position have not been well documented – in fact, simply documenting the density and distribution of Pueblo III sites on the entire eastern Virgin region remains a challenge. Possibly as early as the A.D. 1300's but certainly by A.D. 1500, evidence for what has been called the Neo-archaic is visible (Thompson 1986) (Table 25).

Integrating the Spatial and Temporal Data

“Local sequences... are the very stuff of archaeology.”
Willy and Phillips (1958)

Building a chronological framework for a region or sub-region using dates from a wide range of contexts, in localities scattered over a sizable and diverse area, is best achieved by developing local sequences for each locality. This is a long-term goal, at present, the Grand Staircase chronology is comprised of sequent dates spanning the physiographic section. The best developed local sequence is from the Cottonwood /Kanab Creek drainage (Figure 126). Other logical localities, some with demonstrated sequences based on various horizon markers as well as at least some dates are: Johnson Canyon, Seaman Wash, Fin Little, Kitchen Corral and the Paria River drainages. To the west, beyond the boundaries of the Monument but still on the Grand Staircase physiographic section, Short Creek has one of the better local sequences ranging from BMII into PIII times. All these drainages at least have the potential to have been farmed, if not continuously, over extended periods of time. All flow north-south and have a variety of arable settings between the 5,000 and 7,000 feet. Effective precipitation and length of growing season are the principal variables affected by elevation but soil type and arable settings vary according to geology of the Grand Staircase cliff lines and have an impact the practice of agriculture as well. Other factors that impact settlement are access to construction materials, fuel wood, flora, and proximity to big game corridors and winter range. Based mainly on ceramics and architecture each of these localities appears to have similar, lengthy, occupational sequences. Their continuous occupation over the entire sequence, however, seems

SITE #	LAB #	C13/12	Material	BP age	2 Sigma Range	Cal. Curve
42Ka3494	Beta 64997	-	Charcoal	730+/-60	AD 1215 to 1325 AD 1340 to 1390	AD 1285
42Ka3494	Beta 64998	-	Charcoal	600+/-80	AD 1275 to 1450	AD 1395
42Ka3494	Beta 64999	-	Charcoal	710+/-50	AD 1245 to 1325 AD 1340 to 1390	AD 1290
42Ka3494	Beta 65000	-	Charcoal	100+/-50	AD 1670 to 1780 AD 1795 to 1945	AD 1890, 1905
42Ka3494	Beta 65001	-	Charcoal	700+/-50	AD 1250 to 1395	AD 1290
42Ka3494	Beta 65002	-	Charcoal	510+/-50	AD 1325 to 1340 AD 1390 to 1460	AD 1425
42Ka3494	Beta 65003	-	Charcoal	340+/-60	AD 1440 to 1665	AD 1520, 1570, 1630
42Ka3495	Beta 65004	-	Charcoal	700+/-70	AD 1220 to 1410	AD 1290
42Ka2605	Beta 8421	-	Charcoal	640+/-60	AD 1275 to 1420	AD 1310, 1365, 1375
42Ka4575	Beta 144225	-21.9	Bark	400+/-40	AD 1430 to 1525 AD 1560-1630	AD 1460
42Ka4662	Beta 144224	-20.0	Bone Collagen	80+/-40	AD 1680 to 1745 AD 1805 to 1935 AD 1945 to 1955	AD 1950
42Ka5363	Beta 191066	-23.1	Wood trig	140+/-40	AD 1660 to 1950	AD 1680, 1730, 1810, 1930, 1950
42Ka5628	Beta 150668	-21.5	grass	450+/-70	AD 1400-1530	AD 1440

Table 25. Post-Formative radiocarbon dates from the Grand Staircase physiographic section.

unlikely. This section considers the relationships between the localities over time and suggests how they might relate to one another (Table 26).

Rock Art Sequence

The consistency of rock art styles over time and space on the Grand Staircase suggests a common social identity throughout the entire sequence of occupation. Both Judd and Steward recognized its temporal and cultural significance and took pains to record it. Judd believed he could distinguish between “Basketmaker” and “Cliff - dweller” styles. Steward described dozens of rock art panels between Johnson Canyon and the Paria River. He commented on the design elements he thought common to western America in general: concentric circles “sun disks”, wavy and zigzag lines. He noted

that the most common realistic glyph was a square shouldered anthropomorphic figure “derived from a simple style which started in Basket Maker II times” noting Cave du Pont as an example (Figure 16). Both are represented in his drawing of figures at his site 117 in Johnson Canyon (Steward 1941: figure 61, a-d), Judd’s Cave 3, and again at 42Ka5060. Steward was familiar with Judd’s (1926) written report but apparently made a visit to Cave du Pont because Nusbaum did not illustrate the pictographs there.

Steward noted the prehistoric concern with depicting quadrupeds and hunting scenes in Johnson Canyon – a preference for big game also reflected in the faunal record of excavated sites (see Table 27). He also noted the hunchback flute players in Johnson Canyon (also recorded in

PERIOD	SITES	DATING METHOD	ARCHITECTURE	CERAMICS	ROCK ART
Pueblo III A.D.1150-1250 (depopulated?)	?	None	?	Apparent absence of Shinarump Red Ware	?
Late Pueblo II A.D.1100-1150	Cave 6 (42Ka1576) Kiva Cave (42Ka 1812) 42Ka1696 Cave	TR, C14 TR	Masonry "Kiva" Masonry roomblocks	Virgin series (D) Shin series (p) Kayenta series (t)	Eastern Virgin Kayenta Hatched/Geometric
Early Pueblo II A.D.900-1100	Cave 3? Trail Canyon (42Ka1819)	Ceramic Cross-dating	Jacal rooms, Shallow, benched pithouses	St George B/g	Cave Valley
Pueblo I A.D.700-900	Cave 6 (42Ka1504) Hell Dive (42Ka1695) Cave 1 (42Ka5058)	C14 C14 C14	Circular masonry Silo-like "room" Slab-lined shallow pithouses	Washington b/g	Cave Valley Kokopelli?
Basketmaker III A.D.500-700	Judd's Cave 3? Trail? (42Ka1819)	Pithouse? Superpositioning? C14	Slab-lined cists, shallow pithouses	Mesquite Gray & b/g	Transitional ?
Basketmaker II B.C.100- A.D.500	Cave du Pont 42Ka1596	TR C14	Slab-lined cists	aceramic	"Doughboys", hand prints
Late Archaic Transitional	42Ka5060	Stylistic Cross-dating	Not identified	None	Barrier /Grand Canyon

Figure 126. Cottonwood Canyon local sequence.

Cottonwood Canyon (Manning in Tipps 1985). Among other observations were rock art sites in Kitchen Corral with geometric designs that he took to be derived from ceramic motifs (Figure 124). A similar pictograph occurs in Judd's Kiva Cave. This style has since been called Eastern Virgin Kayenta (Shafaafsma 1971).

Unlike architecture, rock art sequences are not easily dated. The association of dated features with simple panels, such as those at Cave du Pont, is a good start. Reaffirmed on different sites, a probable sequence might be developed. Unlike a local sequence of styles, a composite sequence based on local types extending over a larger area can illustrate temporal, and arguably, social relationships. For example, demonstrating a close relationship between the Virgin Grand Staircase and Fiftymile Mountain populations during Late PII and early PIII times would benefit from such an analysis.

A local sequence of identifiable styles and motifs includes: Barrier Canyon (Figures 10, 12, 13); "doughboy" (Figure 16); "Big Hands" (Figure 64); Cave Valley (Figure 33); Eastern Virgin Kayenta style (Figure 124). All of these styles span most if not all of the Grand Staircase Physiographic Section.

Storage Unit Sequence

The sequence of architectural forms used to store maize are temporally sensitive horizon markers that span the Grand Staircase (Table 18). They demonstrate a common concern with accumulating and protecting surplus produce. A consideration of Virgin storage technology not only informs us about the techniques of storing surplus produce, the methods involved in processing it, group size and organization of those who harvested it, and the

Survey/reference	Total sites	Architectural	Non-Arch.	Acres	Density per sq. mile (architectural)
(1) Central Slide Canyon	60	32 (53%)	28	1,360	15.1
(2) Can Coop Unit 3A	22	11 (50%)	11	1,574	4.5
(2a) Can Coop Unit 3D,3E,3F	28	15 (54%)	13	2,014	4.8
(3) Pleasant Valley Outlet	92	92 (100%)	0	960	61.5
(4) Paria Plateau (1967,1968)	498	345 (69%)	153	54,960	4.
(5) Grand Staircase	457	369 (81%)	88	7,900	29.9
(6) Powell Plateau	-	-	-	-	33
(7) Ryan One & addendum	54	25 (46%)	29	1124	14.2
(8) House Rock #1	94	92 (98%)	2	423	na
(9) House Rock PIT	36	35 (97%)	1	129	na
(10) Central Slide Canyon H.I.	45	25 (56%)	20	1121	14.3
(11) South Slide Arch. Project	52	44(85%)	8	3,000	9.4
(12) White Knolls (2008)	46	35 (76%)	13	640	35
(13) White Knolls (2010)	49	35(71%)	14	1,120	20
(13) (Pinnacle Ridge)	41	26(63%)	15	1,380	12
(14) Mt Trumbull, Little Spring	53	50(94%)	3	640	50
(15) Mt Trumbull, Potato Valley	84	49 (59%)	35	1300	26
References:					
1) McFadden (2006)	4) Mueller (1974)	8) Reid, Zweifel and Snyder (2003)	12) McFadden (2008)		
2) Keller et al (2004)	5) McFadden (1996)	9) Schroeder, Reid and Zweifel (2005)	13) McFadden (2010)		
2a) Keller (2004)	6) Effland et al (1981)	10) Betenson (2006)	14) McFadden (2010)		
3) McFadden (2004)	7) Betenson and Reid (2005)	11) McFadden and Keller (2007)	15) McFadden (2010)		

Table 26. Regional site densities

The Virgin Anasazi: The Grand Staircase

critical importance of maintaining it, but also the behavioral strategies involved in accumulating it. In a very real sense, storage technology reflects the most basic adaptive systems that defines the Virgin Anasazi .

Pitouse Sequence

Pit structures were used on the Grand Staircase throughout the Formative sequence from

Basketmaker II to Pueblo III times. While Archaic structures are known, they are shallow and do not provide an obvious precedent for subsequent Formative structures. Even so, BMII pithouses appear to have been a local development rather than an exotic introduction. This is an important consideration regarding the question of migration vs diffusion as the means for the introduction of agriculture – we might expect immigrants to have

Site	Period	Drainage	screen	Type /#	Bone counts & totals ()	MNI	PP # (small)	Index value
Bonanza Dune 42Ka	BMIII, PI, EPII, Late PII	GS Johnson Canyon	No	PH(11) Tr	A-772 L-400 (2401)	-	19	.590
Dead Raven(1) 42Ka	PI/EPII	GS Johnson Canyon	No	PH(2) ST() Rm ()	A-269 L-107 (624)	-	8	.713
Park Wash Site (2) 42Ka	BMIII, PI	GS Kitchen Corral	selective	PH (2) Tr	A-94 L-26 (353?)	-	6	.783
Arroyo (3) 42ka 3976	LPPII, PIII	GS Kitchen Corral	selective	PH(4) ST (2) Rm (1)	A-480 L-125 (869)	A-7 L-15	12	.790
Kanab Site (4) 42Ka	Early PII	Kanab Creek	selective	PH(1) ST (8)	A-361 L-72 (654)	A-4 L-9	11	.834
Road Kill	BMIII, PI	Kitchen Corral	selective	ST (3) Rm (2)	()	-	?	N.A.
Hildale Project (7 sites combined (5))	BII, PI/EPII	Short Creek	yes	PH Midden	A-90,557 L-98,444 Total of all bone (1566)		?	.544
42WS2195 Site total	BMII PI/EPII	Short Creek	yes	Tables 13.2 (192) 13.3(34) 13.4(23)	A- 192 L-57 (361)	-		.771
42Ws2195	PI/EPII	Short Creek	yes	PH (1) Roomblock	A-139 L-21 (257)	-		.869
42Ws2195	BMII	Short creek	yes	PH(3) Slab-lined F16 (1)	A-50 L-0 (67)	-		1
Reservoir Site AZ B:1:35	BMII	Short Creek	yes	PH (12)	A-171 L-45 (402)	-		.792
Reservoir Site AZ B:1:35	Late PII/PIII	Short Creek	yes	PH(1)Strata 3,3A,4	?			.919
Energy Fuels Nuclear sites					none?			
Gnatmare	LPPII PIII	Cottonwood /Paria River	yes		Small collection			-
42KA6293 (6)	Early PII	Kanab Creek	yes		A-220 L-55 (n-305)	A-6 L-3	15	.800
Hog Canyon	BMIII	Kanab Creek	Yes?		A-11 L-4			.73
Wade report		Kanab Creek/?	No?					
CCCD 42ka1504	LPPII	Cottonwood Canyon/Kanab Crk	yes					
South Fork 42Ka1576								
Cave DuPont								

Table 27. Artiodactyl Index

introduced their versions of pithouse architecture along with maize agriculture.

By BMIII times pithouse architecture on the Grand Staircase was clearly on a local path. Prominent features include the antechamber, bench with symmetrically placed support posts, and various floor pits and partitions. The Pueblo I and Early Pueblo II periods saw the most distinctive local developments of the pithouse and associated storage architecture. Formal traits include the alignment of vent shaft, ash bin, hearth, “foot drum” or vault (in the St. George Basin), and the arc of sand-filled bins first described by Aikens (1965) at Bonanza Dune. These standardized features emphasize the conservative nature of this 350 year period. Around A.D. 1100 masonry-lined “kivas” interrupted the benched pithouse tradition for perhaps little more than 50 years before a return to earthen pithouses. Notably, the formally patterned floor features do not occur in the masonry pit structures. Neither do they, or the bench, occur in the revival of earthen pithouses during Pueblo III.

“Lightpithouses,” shallow structures constructed of wattle and daub, occur as stand-alone, individual residences as early as BM III times (Figure 38). Their construction suggests summer use – possibly as field houses. During Late BMIII or early PI times they are found adjacent to cist alignments (Figure 49). By Early Pueblo II they are incorporated into cist alignments (Figure 67). During Late Pueblo II, lightly constructed residential rooms are formally integrated into roomblocks. Room 4 at Judd’s Cave 6 is a good example (Figure 56). Residential Room 1 in the Arroyo site roomblock demonstrates they persist into Pueblo III times (Figure 103). Lightly constructed pithouses and surface rooms are proposed here to be summer residences and activity areas that compliment pit structures that would have been used during the winter.

Virgin and Kayenta Site Layouts: Contrasts and Comparisons

As Geib, Collette, and Spurr (2001) have pointed out, there are significant differences between Virgin and Kayentan structure types and site layouts during the period A.D. 1100–1150. Because maize farming was basic to both subsistence-settlement systems, it seems fair to assume that its production, storage, processing, and consumption had an impact on site layouts in both regions.

Typical Kayentan layouts include: the kiva, a storage room, use areas and/or jacale rooms, and the mealing room (Geib et al. 2001: Figure 8.1). Mealing rooms have never been identified north of the Colorado River and true kiva features are rare, if they occur at all. Another difference between Virgin and Kayentan sites is the volume and method of construction of storage units. Virgin sites are characterized by large volume units with paved floors allowing them to be virtually sealed. The typical storage-habitation room ratio is 3–4 rooms per habitation unit. Kayentan sites seem to have a much lower storage capacity – particularly on sites with mealing rooms. Since the volume of maize on the cob, shelled maize, and maize flour varies considerably per unit of nutrition, the degree of maize processing might account for different types of storage facility and their volume. Table 28 suggests that Virgin storage capacity per household unit was relatively stable over time and space.

Subsistence/Diet.

Little doubt remains that the Virgin Anasazi on the Grand Staircase relied on agriculture – or at least attempted to do so. Stable carbon isotope analysis indicates that maize was an important part of the diet since BMII times (Martin 1996, 1999). The presence of large capacity storage facilities on virtually all residential sites attests to at least the attempt to rely on it. In the absence of beans and domesticated turkey during BMII times a maize diet probably required a greater reliance on game, but big game corridors and winter range coincide nicely with arable land on the Grand Staircase.

Faunal Resources. There is also no question that a range of native floral and faunal resources were exploited along with domesticates. Across the Grand Staircase Section the faunal records from excavated sites are consistent over time. High protein foodstuffs are always desirable and as a result of big game winter range and travel corridors, it was also readily available. The artiodactyl index (Table 27) indicates that Grand Staircase peoples enjoyed a considerably higher ratio of big game to rabbits than other Anasazi groups (see Fumiyasu 2013, Table 2 for SW Colorado) – although rabbits and hares, either netted, snared, or hunted with arrows, were also a ubiquitous part of the diet. In similar fashion, floral resources were locally available. Although it is unlikely they were a significant part of the diet in

terms of calories, native species provided nutrients, seasoning, and medicinal values.

Native Economic Flora. The macro floral record indicates that a range of native economic types were exploited; quantities are more difficult to determine (Appendix C). Both floral and faunal resources are generally available in the vicinity of agricultural sites. Local collecting from a residential site base accounts well for virtually all subsistence data. Foraging in more distant areas could have supplemented local collecting efforts, but demonstrating this would require identification of logistical camps. Good opportunities for identifying Virgin base camps (and their frequencies) in non-arable zones occur on the Skutumpah Terrace (see Keller 1987), the lower elevations of the Kaibab Plateau, the Kolob Terrace, and the mid-elevation zone on the south side of Parunuweap Canyon (McFadden 2009).

Domesticates. Squash are reported from the earliest sites (Nusbaum 1922). Good evidence for the cultivation of beans was found at the Dead Raven site dating to about A.D. 1000. Two bean fragments were identified from a hearth at the Road Kill site indicating their presence as early as late BMIII / early PI. Domesticated turkey, as evidenced by egg shell and bone at the Kanab site, were present by Pueblo I times. Throughout the sequence ubiquitous Cheno-ams, a virtual byproduct of gardening, made a significant contribution to diet (see Appendix C). Squash, which seems to have a high requirement for water, may have been grown more opportunistically – possibly in damp soils around springs and seeps not suited to growing and tending maize.

Canine remains are known from the Kanab Site during PI/II times and the Arroyo site during the Pueblo III period. Although a good source of protein, the fact their remains are articulated suggests they may have been more useful for hunting, protecting fields from deer, and as pets.

Defining a “Mixed” diet:

Implications for sedentism and mobility.

There has been considerable discussion in the literature regarding the issue of Virgin subsistence as dependent on agriculture versus a “mixed” subsistence (Westfall 1985,1987 , Baker and Billat 1992, Alstrom 2000, Allison 1990, Dalley and McFadden 1988). In large measure, the issue revolves around interpretation: Should the definition of Virgin subsistence be based on macrofloral and

pollen remains or should settlement data play a significant role? Clearly diet would vary over time, geography, and circumstance for a variety of reasons including availability and simple inclination. Stable carbon isotope studies indicate that at least some individuals relied on maize (Martin 1999). Nevertheless, it is clear that both native and domesticates foods stuffs contributed to Virgin subsistence.

A mixed diet doesn't necessarily imply mobile foraging nor does a heavy reliance on domesticates necessarily imply sedentism (Kelley 1992) - at least in the traditional sense. Framed in the context of mobility, direct subsistence data informs us about what foodstuffs were available, consumed, and roughly in what amounts; settlement data, i.e. the distribution of different site types and their structure, deals with the actual behavior involved in acquiring food. To paraphrase Willy and Phillips (1985), distributional data is the very stuff of cultural resource management: it is readily available in the IMACS data base, cumulative through past and future surveys, and can be quantified.

Based on the extant data and the interpretation favored here, the basic Virgin subsistence strategy appears not to have been an option of farming or foraging, but one reliant on domesticates. It was this choice that structured the settlement and activities on the Grand Staircase. Nevertheless, when crops failed the alternative was surely increased reliance on wild foodstuffs. Two options were available; local collecting from the residential base, or a logistical foraging strategy. Admittedly, differentiating between the two is not always clear cut.

The Agricultural Zone:

Farming Opportunities Over Time.

Virtually all agricultural sites on the Grand Staircase occur at elevations between 5,000 and 7,000 feet where growing seasons are long enough (120 days) and modern annual precipitation averages 11 inches (28 cm) or more. Sub-irrigated fields, dry farming the sandy mesa tops, and alluvial outwash are the three main agricultural opportunities on the Grand Staircase. The specialized techniques on the Paria Plateau and House Rock Valley are related to unique hydraulic settings and were apparently restricted to late Pueblo II/III times.

Basketmaker II. The earliest agriculture during BMII, A.D.1-400 is associated with wet if not actually riparian areas; Cave du Pont, Cottonwood

PERIOD	SITE	TYPE	DIMENSIONS	VOLUME Cubic meters
BMII	Cave du Pont 42Ka1765/	Random group (n-30)	5' diameter 3'6"-4' deep	(Average) 1.9 - 2.2
BMII	AZ B:1:35 (BLM) Storage Unit 5	Random group	1.85x1.4 .55 deep (ave)	1.42
BMII	AZ B:1:35 (BLM) Storage Unit 6	Random group	1.72x1.46 .95 deep	2.39
BMII	AZ B:1:35 (BLM) Storage Unit 7	Random group	2.5 (ave)x 1.5 (ave) 1.75 deep	6.56
BMII	AZ B:1:35 (BLM) Storage Unit 8	Random group	1.3 diameter 1.06 (ave)	1.40
BMII	42Ka4478 (MOAC)	Isolated individual cist	2.2 dia. 1.2/.83cm deep	3.14
BMIII	42Ka4859 Road Kill (Cist 1)	alignment	212x175 85 deep	3.15
BMIII	42Ka4859 Road Kill (Cist 2)	alignment	155x285 72deep	3.18
BMIII	42Ka4309 Hog Canyon Shelter Cist 1	Alignment of 6 cists	1.35 diameter 1m deep (est)	1.43
BMIII	42Ka4309 Hog Canyon Shelter Cist 2	Alignment of 6 cists	1.40 diameter 1.20cm+	1.85
BMIII	42Ka4309 Hog Canyon Shelter Cist 3	Alignment of 6 cists	1.30 diameter .70 deep	0.93
Pueblo I	Nipple Alcove (42Ka1812)Room A	Circular Room (1 of 3)	2.94 diameter 2.21 high	15.00
Pueblo I	42Ka5058 Judd's Cave 1, Room 1	Circular Room	3.05 diameter 1.8m high	12.7
Early PII	42Ka2667 Dead Raven, Cist 3	Alignment 1 of 3	2.45x1.55 .50m+	1.90
Early PII	42Ka4859 Road Kill Cist 3	Alignment	218x172 85 deep	4.37 (est)
Early PII	42Ka6293 Cist2	Alignment (1 of 3)	185x320 65cm deep	3.85
Early PII	42Ka6293 Cist 3	Alignment (1 of 3)	1.50x2.00 .73cm deep	2.19
Early PII	42Ka6293 Cist 4	Alignment (1 of 3)	1.5x.2.1 59cm deep	1.46
Late PII	42Ka3332	Isolated room	3.6 x 1.4m 1m high (est. min.)	5.04
Late PII	42Ka1813 Judd's Cave 3 (Room 3)	Separate room (1 of 2)	2.59x1.47 Est.1.5m high	5.71
Late PII	42Ka 1813 Judd's Cave 3 Room 4	Separate Room (1 of 2)	1.57x1.22 Est.1m high	1.92
Late PII	42Ka3694	Room 1 (of 2)	2mx1.90m 1.5m high	5.70
Late PII	42Ka3694	Room 2 (of2)	2.5mx160m 1.5m high	6.00
PIII	Pottery knoll , room 1	One in a large roomblock	2.77 x 1.69 (assume 1 m high)	4.68

Table 28. Storage volume estimates

Canyon, Hog Canyon, Johnson Canyon and Kanab Creek are good examples. This may actually reflect an early preference for relatively small, restricted, perennially wet areas, possible given a low population. It could also reflect just one of multiple farming strategies. The high incidence of dated BM II sites in these settings is at least in part a result of their association with dry caves (that occur in watered, canyon environments and hence preserved perishables that are relatively easy to locate and date. Their high incidence might be a result of sampling error. At some point during the BMII period we recognize sizable clusters of what appear to be habitation sites in upland dry farm settings. Known examples are Seaman Wash, Johnson Canyon, and Kanab Creek. While “upland” they are not far from the watered canyons below. They could simply indicate a preference for living in more open, wooded areas, or possibly be co-existing, complimentary farming strategies.

Basket Maker III A.D. (400-700). By Basket Maker III the uplands are well settled; good examples are 42Ka1796 associated with dry farming the uplands of the up Virgin River at about 5,800 and 42Ka2780 overlooking the alluvium along Seaman Wash at 5,200 feet. Farmsteads occur along most, if not all, of the major Grand Staircase drainages.

Pueblo I. (A.D. 700-900). By Pueblo I most agricultural niches were being farmed - perhaps with a tendency for higher elevations (6,000 feet in the upper Virgin River drainage) as well as perennially watered areas, again Kanab Creek, Johnson Wash, Seaman Wash. Notably, dryfarming was viable during this early Puebloan period on the benches above the North Fork of the Virgin River at elevations averaging 6,000 feet but approaching 7,000 feet on Glendale Bench. These were flat, sandy areas not subject to down-cutting. Local hunting and gathering opportunities occur on the lower benches along the Virgin River on the south side, within the canyon below, as well as higher elevations on the Kolob Terrace. Elsewhere the focus of settlement may be on perennially watered drainages such as Cottonwood Canyon, Kanab Creek and Johnson Wash. There is some suggestion of aggregation at large residential sites that are centrally located among dispersed farming options that may have required logistical movement as suggested by isolated granaries and associated camps.

Early Pueblo II. (A.D. 900-1050). There may be a tendency for occupation to persist on Pueblo I times (see the Kanab site dates). Initial occupation during PII times however are located in dryfarm and open settings well away from drainages. Site distribution is difficult to characterize but it is safe to say that all of the previously farmed areas continued to be exploited and perhaps it is accurate to say that new, sparsely used settings well out on the alluvium and away from drainages but seem to have been more viable during this period. Such sites were identified on the Seaman Wash and Fin Little inventory tracts. In general favored agricultural settings changed very little during the early Puebloan periods. The site frequency during early Pueblo II drops off only slightly in the dry farm settings of the Upper Virgin River and increases only marginally along the Vermilion Cliffs east of Kanab (see Figure 5).

Late Pueblo II (A.D.1050/1100- 1150). This period sees the greatest expansion into new areas - possibly as a response to increased rainfall. Favored farmstead locations make a pronounced move to alluvial outwash settings, a trend particularly evident in the SWI and FLI distribution data. This trend coincided with a significant population increase - at least terms of site numbers (Figure 6). The increase in Late PII site frequency could reflect: 1) the occupation of multiple sites over a period of time; 2) the actual migration of Kayenta people to the Grand Staircase, or 3) in situ population growth as proposed by Aikens (1966).

Pueblo III (A.D.1150 - 1250+). Site distribution patterns are difficult to assess due to difficulty identifying these sites. It seems safe to say however that previously recorded Late PII sites may actually postdate A.D.1150. If the climate ameliorated late in the 12th century as Benson and Berry (2009) believe, we might expect a continuation of Late PII sites into the 13th century. As evidenced by significant masonry roomblocks it seems reasonable that by after A.D. 1150 both major water courses, smaller alluvial outwash opportunities, and the uplands along them were being farmed. The Kitchen Corral drainage is a good example; significant numbers of late sites occur along the drainage - although only a few have actually been dated e.g. the Arroyo site and Pottery Knoll. Other site occur in the uplands but have only been cross-dated by architectural style (plaza layouts) and the frequency of Shinarump Red Ware (see Appendix D).

Discussion: Persistence and Reoccupation

The foregoing description of site distribution patterns and their agricultural settings is an attempt to address environmental-behavior correlations as proposed by Dean et al. (1985) and specially encouraged on the Grand Staircase by the late Robert Euler (personal communication n.d.). While addressing the relationship between settlement and paleo environmental variability clearly has merit, site distribution patterns on the Grand Staircase have a good deal of overlap from period to period. What the description of arable settings above does not address is: the degree of persistent occupation, from period to period in some settings and on some sites, nor the reoccupation of selected sites, sometimes hundreds of years later – both cases are amply documented on the Grand Staircase. While there is some evidence that these occupations are related to changing climate regimes that permitted expansion into a wide range of settings, in other cases farming was restricted to particular settings, and in some periods there seems to have been an option of staying put or moving on. Pursuing this line of reasoning remains a viable research goal on the Monument.

Quantifying Agricultural Production

If we can assume that the accumulation of surplus is the essential purpose of agriculture, how the surplus was stored and in what quantities is a key question that addresses both settlement and subsistence behaviors. It also enters into the discussion of how and why Virgin site architecture differs from that in the Kayenta region.

Estimating Maize Storage. Storage volume relates directly to group size and their dependence on produce. It is also directly correlated with sedentism and mobility. Volume estimates for storage on Grand Staircase sites appear to be consistent through time and generally fulfill or exceed the annual requirements of a small family to subsist on a maize-based diet (Table 28). This is a useful measurement, but one that involves several assumptions that need to be considered.

Maize can be stored in three ways, and probably was; on the cob, shelled, and cracked as meal. The volumes for maize in these three states varies considerably and is a key variable in determining overall values. Wilshusen has provided estimates for Anasazi household requirements in the upper

San Juan River drainage (Wilshusen 1986). He assumes that one metric ton of shelled maize was the annual requirement for a household of five. This equates to 43 bushels or 1.5 cubic meters of space. If secured in ceramic jars this amount would require 215 seven liter vessels that would have required 12 sq. meters of storage floor space if not stacked. Assuming a yield of 10 bushels per acre, the nuclear family would have required 4.3 acres of field.

The size and construction of storage units on the Grand Staircase suggests that the “granary as vessel” method was used through Early Pueblo II times and possibly persisted into Pueblo III. A cursory review of overall ceramic counts of excavated sites in the Virgin region suggests that the plain gray utility vessels virtually never even approach the number necessary to account for storage in this fashion. Neither is storage unit floor space generally big enough to hold 215 vessels although careful measurements of rooms needs to be taken. If storage did shift to ceramic vessels, we would expect: 1) an increase in room size or number and 2) a concomitant increase in ceramic debris and 3) storage rooms with earth floors rather than paved and sealed floors. To this end, future ceramic analyses, in addition to providing traditional sherd counts, might consider providing grayware weights that could be used to estimate the total number of vessels represented. Whether a shift to a more Kayenta style method of storage occurred during the Kayenta expansion during Late PII is unresolved but the persistence of floor pavements in excavated room blocks (Figures 103, 108, 109,) and sealed granaries in the old tradition on the Kaiparowits Plateau indicates the method continued into Pueblo III times.

Nash (2013) has provided a set of metrics for assessing storage quantities at 42Ka6293 along Kanab Creek (Figure 88). He assumes that if maize was left on the cob approximately twice the volume would be necessary. Although roughly similar to Wilshusen's, developing a common standard for future estimates of both volume and vessel counts would be a useful exercise.

Discussion. Relying on agricultural produce throughout the year requires a means of securing the surplus. The variability of storage types over time on the Grand Staircase may be unparalleled on the Colorado Plateau (see site descriptions). Cist technology was clearly the preferred method from

BMII – through Early Pueblo II and possibly later. Table 28 suggests that the amount of maize sufficient for consumption and seed corn was available during all periods. Storage technology, depending on what was stored, it can be argued changed little.

Direct evidence for storage in ceramic vessels is rare. Aikens recovered a single small jar of amaranth seed at Parunuweap Knoll (Aikens 1965) – this on a site that had a cist capacity of literally 100's of bushels. Beans appear to present by Pueblo I and there is good evidence for their cultivation by A.D. 1000 (see Appendix C). Ceramic vessels probably would have been suitable for relatively small quantities although bags or baskets secured in a residential rooms were another option. Jars would have been useful for a variety of wild seed as well. The requirements for storing squash were probably minimal.

The Tarahumara of northern Mexico provide insight into how isolated granaries might have functioned in the Virgin settlement system (Hard and Merrill 1992). These groups derive approximately 75% of their diet from stored maize. They sometimes plant dispersed fields and regularly transport maize from fields to winter residences. The “cost” of transporting produce from a distant field to a winter residence is relative one. Hard and Merrill (1992) describe yields of 100 to 600 kg of unshelled dried maize being transported in 20kg sacks from the valley floor to winter residences 600 meters above. Similar logistical requirements may have been necessary for transporting produce from outlying Virgin Anasazi fields to residential bases.

Integrating Subsistence, Settlement, and Site Structure Data

Sequential Occupation as a form of Residential Mobility

Since Aikens' work at Bonanza Dune it has become apparent that the sequential occupation of farmsteads is a salient characteristic of settlement on the Grand Staircase. A sequence of occupation on a given site implies its temporary abandonment and consequently movement elsewhere – apparently to a similar site. Aikens' excavations at Bonanza Dune provided an excellent demonstration of this phenomena (1965). Jennings remarked: “There were six sequent complexes of two or three structures used contemporaneously; occupancy was not continuous

from one complex to the next” Jennings 1978: 111). In this regard Virgin settlement seems to differ from the Kayenta region where site occupations are said to be on the order of 2 or 3 generations (Bernardini 2005). Bernardini describes population movement from site to site as “serial” occupation. The Virgin pattern of settlement proposed here might be considered “sequential” occupation. While it involves a particular form of mobility, it is considered a sedentary strategy.

To one degree or another, during all periods and along each of the major drainages, the repeated use of sites is evident. As at Bonanza Dune, these occupational sequences are most obvious in situations where dwellings were superpositioned or used as dumps, but they were rarely reused. Storage units were another matter. Beginning with the earliest Basketmaker cists storage facilities were rarely abandoned but were often refurbished with additional units added over time. While the new structures changed in shape, size, and were configured in different ways, their function as sealed granaries did not.

The adaptive implications for the use of cist technology on sequentially occupied sites include: 1) refurbishing, rather than building new granaries, was advantageous and economical; 2) using cist technology to store maize on the cob, would negate the need for making literally hundreds of storage vessels necessary to store shelled corn and, 3) it would not be necessary to either transport the vessels during resettlement or to duplicate them. Leaving the vessels on an unoccupied site might invite their loss, while abandoning storage granaries for a period of time would not. The continuity of early storage technology during most, if not all, of the Virgin sequence may have been an important aspect of the sequential occupation of residential sites.

Agricultural Models of Virgin Anasazi Mobility

Foraging, collecting, and farming all involve different types and degrees of mobility. At its simplest, settlement analysis is a matter of describing the range of site types in a given area, during a given bracket of time, and considering the relationships between them. This exercise in modeling assumes that farming and foraging on the Grand Staircase were not random activities but were structured to meet the subsistence needs

of small, family-sized groups. The key variable driving movement is assumed to have been short-term annual fluctuations in weather and long term climate change. The patterning of various site types suggests that they express a shared behavior we might consider a strategy or subsistence system. Two such strategies operative during the Formative period are described below. Arguably, these models account for the structure and distribution of most architectural sites on the Grand Staircase.

Sedentary Model: Serial and Sequential Residential Mobility. This model describes the self-contained farmstead with a full complement of storage, residence, and activity areas that is well documented in various forms throughout the entire Virgin sequence. The sequential reoccupation of many, if not most of these sites, which implies their cyclic reuse, is a salient characteristic throughout the Virgin sequence. It may be, at least in part, a result of the lack of opportunities for serial expansion to new areas (Bernadini 2005). The social implications for this type of occupation have been described as the “Virgin Pattern” (McFadden 1996); the sequential mobility model described here is essentially descriptive and simply derived from reconstructing site construction histories.

Site locations were selected primarily for their agricultural potential - essentially the site functioned as a field house. Local collecting and hunting activities were carried out within a short distance

from the residential base although occasional logistically organized moves to remote foraging camps may have occurred when necessary (Figure 128). In terms of behavior, mobility among multiple residential options, considered here a specialized form of sedentism, is congruent with both the overall site distribution pattern, as well as internal site structure on excavated sites. Good examples described in this volume include : 42Ka1969, 42Ka4280, 42Ka4859, 42ka2667, 42Ka1076 and 42Ka6293.

Logistical Model: Mobility Farming Strategy. This strategy accounts for how isolated granaries, with little more than camps associated, relate to year-round occupied residential sites. The sites are often associated with small or risky arable settings in damp canyon bottoms or stream corridors. Their use is viewed as part of a supplemental strategy that compliments the basic sedentary model, rather than one that supplants it (Figure 128).

Many isolated granaries are described in this volume. These nonresidential storage sites occur throughout the sequence, but seem to be particularly common during Pueblo I times. Their context in terms of the overall distribution of residential sites is often difficult to assess, but at least some appear to be outliers representing logistically organized mobility. Good examples described in this volume are 42Ka1520, 42Ka1811, 42Ka5058, 42Ka4280, 42Ka1694 and 42Ka1574.

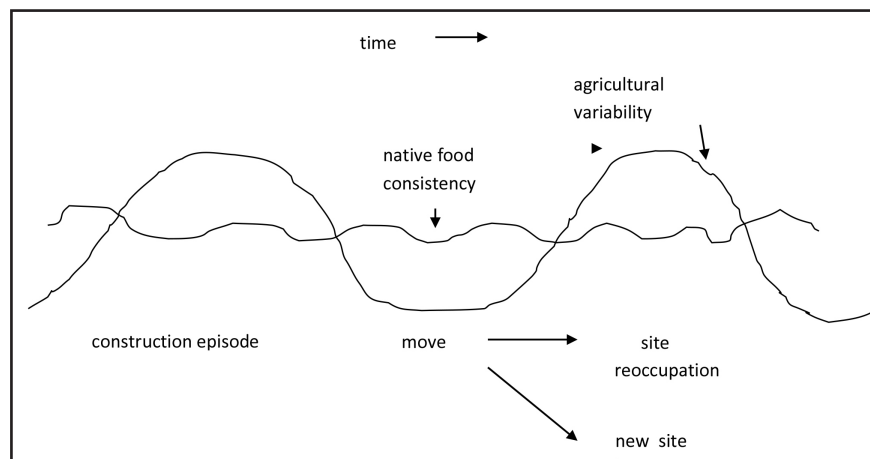


Figure 127. Mobility schematic of the relationship between collecting and agricultural production and residential movement options. Collecting options are relatively stable, agricultural production is variable and drives construction episodes during optimal times and movement to new locations or previously occupied sites during periods of stress.

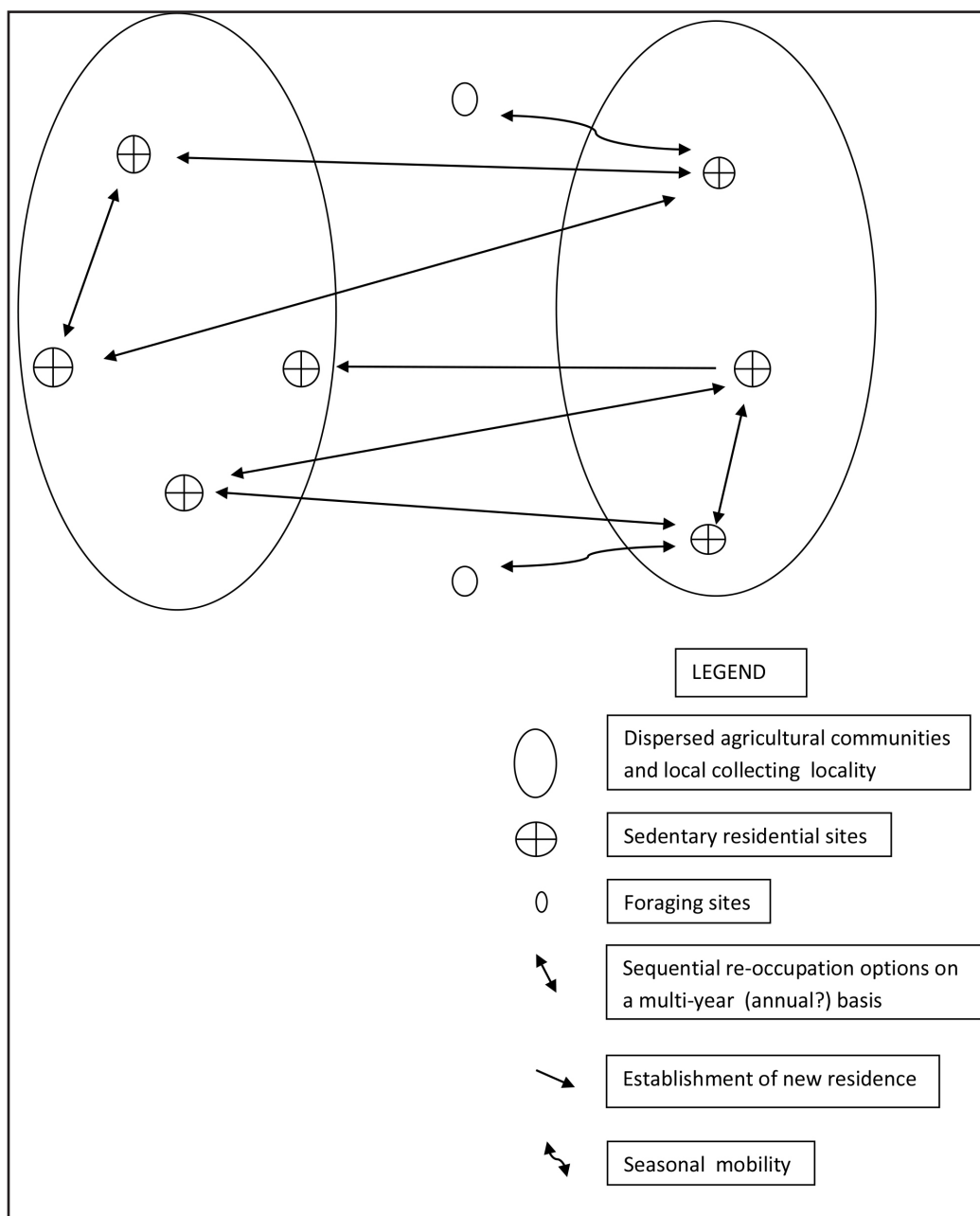


Figure 128. Schematic of relationships among sequentially occupied sedentary farmsteads; between farmsteads and remote fields (with granaries); and local collecting and remote foraging opportunities.

THE FREMONT: ESCALANTE DRAINAGE & KAIPAROWITS PLATEAU REGION

The organization of this section is similar to the preceding section for the Virgin Anasazi of the Grand Staircase. The introduction provides a brief spatial-temporal overview of the area involved and the temporal frameworks presently in use. This is followed by individual site descriptions of recently dated, or otherwise significant sites, organized chronologically. Finally, the descriptive data is synthesized in the form of a chronology of artifacts, architectural styles and, in some cases, major shifts in settlement and subsistence patterns.

Spatial-Temporal Distribution

Noel Morss was the first to describe the Fremont culture east of the Monument in the Fremont River drainage (Morss 1931). Although Morss conducted excavations at the Coombs site, it appears he was not aware that the Fremont extended west to the upper reaches of the Escalante River. By 1955 James H. Gunnerson was conducting archeological survey near the confluence of Calf Creek and the Escalante River for the Utah Statewide Archeological Survey instituted by Jesse Jennings. Gunnerson recorded puebloan-style granaries, a rock shelter, and an open village site (BLM files). This initial foray into the area served to orient his inventory and excavation work for the Glen Canyon project. In 1957, Gunnerson (1959) excavated at 10 sites in the Escalante drainage including two residential sites near the town of Escalante; the Spencer Site, and Rattlesnake Point. Both displayed pottery

Gunnerson labeled Escalante Gray - a type he believed to be associated with the Virgin Anasazi. By the early 1960's, Gunnerson's Escalante Gray was considered a variant of Emery Gray - a Fremont type found in the San Rafael area (Lister 1964). This clarification of ceramic typology allowed mapping of the Kayenta and Fremont culture areas. Based on the interpretation of mixed ceramic assemblages, large areas were also mapped as "areas occupied by Kayenta where important contact with Fremont Pueblo occurred" and, conversely, "areas occupied by Fremont Pueblo where important contact with Kayenta occurred" (Lister 1964: vii).

The relationship between the Fremont of the Escalante area and the San Rafael may in fact be minimal. Excavations at Old Woman (Taylor 1957), Poplar Knob (Taylor 1957), and Snake Rock (Aikens 1967) demonstrate that the core area for Emery Gray extends from Ivie Creek in the north to Harris wash in the south (Madsen 1977). Apart from a common ceramic type, sites in the two areas have little in common. Probable separate culture histories, as well as dramatically different environmental settings, suggest that they pursued independent adaptations.

During the early 1980's, the extent of the Escalante area's Fremont occupation was realized by BLM archeologists. More important was the recognition that site types and their distribution contrasted greatly from those on the Grand Staircase (Figure 129). This section considers the

Fremont culture in a sense similar to that proposed by Madsen and Simm's (1998); not as a monolithic whole, but as a local adaptation to the Escalante drainage and surrounding uplands.

Several temporal frameworks have been employed to order the material culture of the Fremont, on the Colorado Plateau. Those relevant to this study include Black and Metcalf's (1986) sequence for the San Rafael area; Schroedl's (1991) suggestions for the Monument area; and most recently, Geib's (1996) temporal framework for the Escalante drainage based on his work in the Glen Canyon National Recreation Area.

The initial temporal organization of the site descriptions employs the framework used by Geib (1996) for the Escalante Basin. Its utility is its general and descriptive nature; given the considerable

number of new dates available. However, a local sequence of phases seems preferable. Although Black and Metcalf's (1986) temporal framework is quite similar to the chronology proposed here, its applicability for the Escalante area has not been demonstrated. Schroedl's term Escalante Phase (300 B.C.- A.D.700), which covers the terminal phase of the Late Archaic, has been retained with modified dates. The Escalante Phase is followed by a period during which only Fremont ceramics are present; a new term - the Wide Hollow Phase, is assigned to this period. A relatively large number of dates fall within this 500 year "Fremont" period. After A.D. 1050 or possibly as late as A.D. 1100, Anasazi ceramic types become the dominant style that marks the beginning of the Late Formative Period.

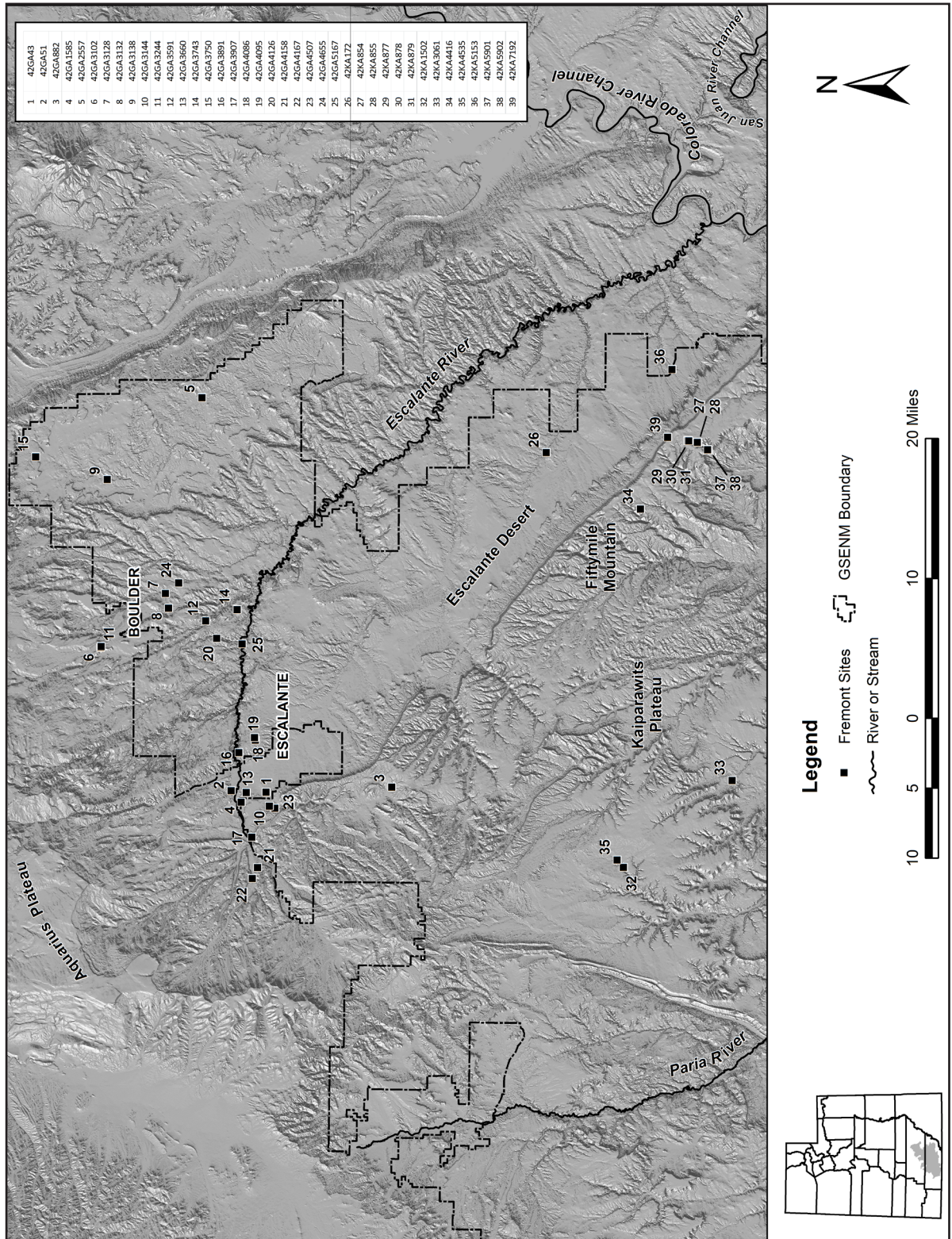


Figure 129. Dated Fremont sites.

EARLY AGRICULTURAL PERIOD SITE DESCRIPTIONS

42Ga2557 Tar Sands Project (Tipps 1988)

The Tar Sands Inventory recorded three buried pithouses exposed in road cuts in two separate locations in the Circle Cliffs: two at 42Ga 2557 and a single structure at Ga2570. All of the structures were visible as saucer-shaped charcoal and ash lenses up to 10 cm thick and 3.5 to 4 meters in diameter. A sample of the charcoal from one of the pithouses at 42Ga2557 yielded a radiocarbon age of 1700 +/-60 B.P. (Beta 7705). Tipps (1988:73) gives the tree-ring corrected equivalent as A.D.185, with a 95% confidence interval of A.D.80 to 450 (cf. Klein et al.1982). Beta Analytic Inc. provided a two sigma range of A.D. 225-465, 475-515 with a calibrated midpoint of A.D. 380 (Darden Hood, personal communication, 1995).

42Ga3132 Casa Del Fuego (Tipps 1988)

The Burr Trail mitigation project (Tipps 1991) excavated a single aceramic pithouse east of Boulder dating to the Early Agricultural period. The site is situated in the Deer Creek drainage at an elevation of 5,800 feet . The structure was shallow,

somewhat oval in plan with a lateral entry to the south. The floor measured 3.78 m NE-SW and 2.88 m NW-SE (Figure 130). It was encircled by a series of support posts and covered with “sticks twigs and daub” (Tipps 1988:7-8). An unlined hearth was located near the entryway. Extramural features include a nearby slab-lined hearth as well as several additional hearths and stains on the dune to the northwest. Floor contact artifacts included an Elko series projectile point, an indeterminate projectile point, two one-hand manos, and several flakes. In addition, two bifacially ground sandstone basin metates are pictured and described as “floor fill” artifacts (Tipps 1991: 7-28, 29). Nine tree-ring specimens (2 Ponderosa Pine, 7 juniper) were submitted to the Laboratory of Tree-Ring Research - none were datable. Tipps reports two dates from the pithouse: charcoal from a posthole yielded a radiocarbon date of 1550+/-60 (Beta 20671). Tipps (1991:7.7) citing Struiver and Reimer (1986) provides a tree-ring corrected age of A.D. 426-572. A second date of 1580+/-60 (Beta35560) was obtained from a pole in the fill that yielded a tree-ring corrected age range of A.D. 410-542 at 1 sigma (Tipps 1991; 7.7). Beta Analytic's 2 sigma calibrated dates are similar; A.D.405-640 (Beta-20671) and A.D.380-620 (Beta-35560).

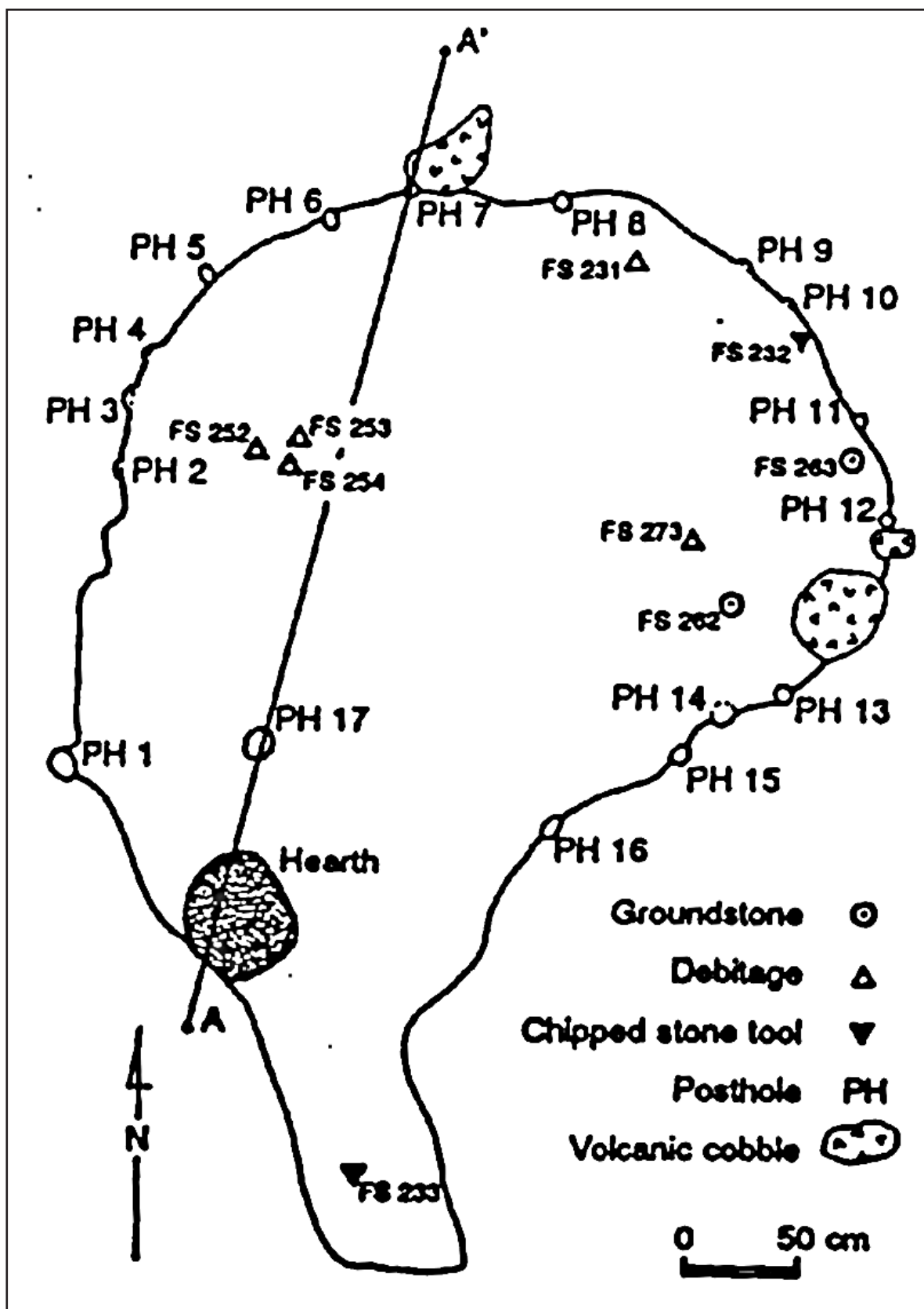


Figure 130. 42Ga3132, Plan map of Casa Del Fuego.

42Ga3591 Boulder Creek Shelter

42Ga3591 was recorded as part of an ARPA investigation conducted by the BLM in 1991. This east aspect shelter is located along Boulder Creek at an elevation of 5,600 feet. Deposits nearly 2 meters deep display a wide variety of artifactual material i.e. milling stones, a skewered corn cob, hammerstones, lithic debris, and a great deal of bone. While two sand-tempered Moenkopi sherds indicate a Late Formative use of the site, the primary occupation is probably preceramic. No Fremont ceramics were observed. Slab uprights indicate buried architectural features, possibly cists or a pithouse. An extensive panel of petroglyphs occurs along the back wall of the shelter.

A fragment of charcoal from a small slab-lined feature, exposed in profile, yielded a conventional date of 2,040 $\pm$ 50 B.P. (Beta 54183) with a calibrated (2 sigma) range of B.C.175 - A.D. 75. Additional opportunities for dating occur at this significant site.

42Ga3743 Haymaker Bench Camp

This large open site consists of a series of stained sand and burned sandstone scatters and two well-defined, slab-lined hearths. The apparent camp is located on a sandy ridge well above the Escalante River at an elevation of 5,760 feet. It is situated on a south aspect slope and is backed on the north by an outcrop suggesting a possible function as a cold season camp.

Stone artifacts on site are numerous and include: 2 slab milling stones, 2 basin milling stones, 5 single-handed manos, 2 cores, a biface, and a chopper. Lithic debris was relatively sparse.

Both hearths contained materials suitable for radiocarbon dating. The F2 hearth was well-made, measured 70 cm in diameter, and was constructed of unshaped sandstone pieces set in a conical pit. Small fragments of charcoal yielded a conventional age of 1910 $\pm$ 160, a 2 sigma range of B.C. 355-290, B.C. 230-A.D. 450, with a calibrated midpoint of A.D. 100 (Beta-23057). The F-3 hearth was well constructed, one meter in diameter, had slabs on the bottom (30 cm from top of liners), and may have been rebuilt. A sample of twig-sized charcoal provided a conventional age of 1500 B.P. $\pm$ 140 with 2 sigma results A.D. 245-800 and a midpoint of A.D. 590 (Beta-23058). Although dates do overlap slightly, the site could easily have been occupied over a lengthy period of time. It is a typical aceramic, probably non-agricultural, site in this area and seems to represent a camp/seed processing locale.

42Ka172 The Alvey Site, Level 1 (Gunnerson 1959b; Geib 1996; 58-59)

Level one describes the lowest stratum at the Alvey rock shelter site (see description under the Early Formative Period below). A relatively small amount of excavation in the aceramic deposits of Level I yielded solid evidence of an Early Agricultural occupation. (Table 29).

42Ka5153, Sooner Water site

This site is located in the Escalante Desert at an elevation of about 4400 feet. The primary feature on site was a hearth exposed in an eroding dune deposit cut by Sooner Wash. The hearth was a dish shaped basin lined with small flat cobbles. Maximum

10	86	Beta 34942	1690 $\pm$ 80	AD 145-548
12	126.2	Beta 34944	2260 $\pm$ 90	512-57 B.C.
13	---	AA-10373	1735 $\pm$ 50	AD 216-423
14	---	AA-10374	1755 $\pm$ 50	AD 142-415
15	---	AA-10375	1830 $\pm$ 50	AD 79-337

Table 29. Early Agricultural Period radiocarbon dates from 42KA172, the Alvey Site (after Geib 1996:87-88).

diameter of the hearth was 70 cm., maximum depth was about 10 cm. Fill consisted of abundant fine charcoal, a sample of which was radiocarbon dated to Cal A.D. 400-560 at 2 sigma (Beta 146080) with an intercept of A.D. 440.

Extending to the south of the hearth about two meters is a lens of lightly stained sand. Three meters to the south is a semicircular alignment of large cobbles exposed in plan on the floor of the wash. The alignment is about three meters in diameter and extends into the cut bank. Just above the wash

bottom, within the alignment, is a discontinuous, but dense lens of charcoal.

No artifacts or ceramics were noted on site. Although the hearth is not necessarily associated with alignment, the site seems to represent a temporary camp associated with Sooner Rocks and its reliable source of water. Nearby are both open and sheltered camps with abundant ground stone and ceramics that indicate the area continued to be used as a foraging locale into the Wide Hollow and Late Formative Periods.

EARLY FORMATIVE PERIOD SITE DESCRIPTIONS

42Ka172, Alvey Site (Gunnerson 1959b)

The Alvey site is a north aspect rock shelter located on the Dry Fork of Coyote Gulch, a tributary to the Escalante River. Its north aspect suggests seasonal occupation during the summer. Tested extensively by the University of Utah during the Glen Canyon Project (Gunnerson 1959b), excavations were carried out to a depth of 14 feet; cultural material was found to a depth of 12 feet.

Three major cultural levels were identified. Level I, the lowest, was up to 7 feet thick and contained lenses of charcoal stained sand. It yielded two large, notched blades, an atlatl fragment, a one-rod-and-bundle basketry fragment, and a one-handed mano. A rock-lined hearth was encountered in the upper portion.

Level II was from 2 to 3 feet thick and contained some vegetal material, charcoal, ash and detritus. Features included three slab-lined storage cists built against the back wall and a cluster of four hearths. Partial human remains were encountered and indirectly associated were nearly 100, apparent *Olivella* sp., shell beads. The remains appeared to have been washed in from elsewhere. Only 114 sherds were collected from Level II: 16 North Creek, 2 Escalante Gray (Emery), one corrugated, 4 sherd tempered, and surprisingly 91 Snake Valley Gray sherds. Geib (1996:86) selected a cob fragment from a charcoal and ash strata to date Level II. It yielded a 2 sigma range date of A.D. 145-548 (Beta34942).

Given the implications for cultural affiliation, Gunnerson's description of North Creek Gray and its variability, is of particular interest (Gunnerson 1959: 61- 63). Non-basalt tempered plain gray pottery, in association with basalt-tempered Emery Gray, is found in small amounts throughout the region. Jar rim forms from the Alvey site appear to be typical of early Pueblo II on the Grand Staircase and elsewhere in the heart of the Virgin region, and not unlike those that are clearly Emery Gray. Gunnerson describes the temper as variable, consisting of sand and some crushed sherd. The question of whether these sherds are simply a local

Fremont type produced in an area where basalt temper was not available seems worth pursuing.

Level III, was the uppermost level at the site and averaged 2.5 feet thick. In addition to layers of ash and charcoal, it contained corn husks, corn cobs, and extensive layers of grass. Notably, "pits which had originated in Level III sometimes extended below it" (Gunnerson 1959b:55). This suggests the possibility that prehistoric activities could have mixed the deposits. The only architecture was a "D" shaped masonry room built against the back wall measuring 7.5 feet wide by 6.5 feet. The floor consisted of a sandy adobe and held a basin hearth.

Rock art on the walls of the shelter consisted of typical Fremont styles including triangular pictographs of anthropomorphic figures depicted with a series of linear lines (see Figure 142). The several hundred sherds collected in Level III were overwhelmingly Late Pueblo II and, like the rock art, were similar to assemblages found on Fifty-mile Mountain. "Geometric" designs might be reviewed in the future and compared with those occurring on the Grand Staircase.

Of six radiocarbon dates obtained from corn cobs collected from this site, none are ascribed to the Early Formative Period (Geib 1996:88). This is interesting given the quantity of material culture items from Level II which are assigned to this period. Artifacts include stemmed projectile points (cf. Rose Spring) and "North Creek Gray" jar forms assigned to the early Pueblo II period in the Virgin culture area A.D. 900-1070. Numerous organic artifacts from Level II are curated at the University of Utah that could be radiocarbon dated to resolve chronological issues on the site.

The Alvey site was intensively used during the Early Agricultural Period. Its continued occupancy by bearers of Anasazi material culture suggests the site had a similar function into Late Pueblo II times. Equestrian figures superpositioned over the Fremont rock art appear to represent use by the Southern Paiute. It is worth noting that both the Alvey site and 42Ga1006 yielded partial human remains and had evidence (brownware and charcoal rockart in the case of 42Ga1006) of a Southern Paiute presence.

As a result of the land exchange with the State of Utah in 1998, the Alvey site now lies on lands managed by the Grand Staircase-Escalante National Monument. Shortly after the exchange the Alvey site was relocated and assessed for additional potential. This resulted in a proposal written by Phil Geib, then at Navajo Nation Department of Archaeology, to conduct investigations involving the analysis of curated artifacts, radiocarbon dating, additional excavation, and geomorphological investigations. The proposal was never acted on but has merit and remains on file.

42Ka3061 Wesses Granary

This isolated granary is located in Wesses Canyon on the Kaiparowits Plateau at an elevation of 4,900 feet. Its location is protected but accessible in a low overhang well above the canyon floor. The structures walls were formed by sandstone slab uprights and roofed with small diameter riparian wood covered with slabs and clay. It is a small volume structure measuring 110cm by 110cm with walls about 50cm high.

Although the canyon is presently dry, a spring occurs within a few hundred meters. It is also less than one kilometer from a sheltered site (42Ka4525) that displayed a Lino Black-on-Gray sherd and both coarse sand tempered "Lino" and Emery Gray ceramics. A radiocarbon date for 42Ka3061 was obtained from a small diameter riparian twig that was used in construction of the roof. The 2 sigma range of A.D. 550-A.D. 800 with an intercept of A.D. 660 (Beta 121576), places it within the Basketmaker III Anasazi period and the Early Formative Fremont period.

42Ka4535 Fourmile Shelter

This site is a large, deep, north aspect rock shelter in Fourmile Canyon. Like virtually all rock shelters and granaries yielding evidence for maize agriculture on the drier portions of the Kaiparowits Plateau, it is associated with arable canyon bottoms fed by springs. Its elevation is 5,640 feet. Although badly looted, masses of stick impressed structural clay evidence a probable storage granary; a bell-shaped pit exposed in profile is evidence for a second, possibly earlier, storage feature. Numerous grooves, slicks and incised lines are present on

large boulders. Milling slabs, minor lithic debris, and a cobble chopper make up the limited artifact assemblage. A dozen 14-16 row corn cobs and some husk remains indicate local agriculture.

A corn cob provided a radiocarbon assay of A.D. 575 - 770 with a midpoint of A.D. 635 (Beta 121577). Although Fourmile Shelter is assigned to the Kaiparowits/Fremont chronology, the site could as well be regarded as early Anasazi. The single sherd on site appears to be Shinarump plain which probably originated on the eastern end of the Grand Staircase where Basketmaker III residential sites are common. Unlike the Basketmaker Anasazi sites on the Grand Staircase, Fourmile Shelter seems to represent a seasonally occupied farming locale - a settlement type that has more in common with the seasonally mobile Fremont pattern postulated for the Escalante drainage.

42Ka1502 Rockshelter

This north aspect rock shelter occurs adjacent to a perennially flowing segment of Fourmile Canyon. It is situated approximately 200 feet above the canyon floor at an elevation of 5,600 feet. Although the overhang provides good shelter, there is no permanent architecture. Artifacts observed include a single Emery Gray sherd, a few sand tempered gray sherds, three dressed portable slab/basin milling stones, and a single-handed mano. Corn cobs are abundant (ca.100) and one corn husk was observed. The corn cobs are large and row number is generally 12+. The single 2 sigma range radiocarbon date of A.D. 695 to 995 (Beta-107649) from this site was obtained from a corn cob. The possible association of a nearby granary (42Ka1511) may represent an alcove/camp-granary complex similar to those found in riparian settings along the Escalante River.

42Ka4416 Arch Granary

This is a sheltered site with a granary and red pictographs located in an upland pinyon-juniper setting at 7,120 feet on Fiftymile Mountain. The granary is a free-standing masonry structure very similar to 42Ga4126 in Calf Creek (Figure 131). Associated with it are two simple red-pigmented pictographs and a crude rock alignment forming a sheltered use area. All of these features are sheltered under a broad arch. The single 2 sigma radiocarbon



Figure 131. 42Ka4416, free-standing granary.

date of A.D. 780 to 1020 (Beta 107650) was obtained from a corn cob found in the mortar matrix of rubble that had collapsed into the cist. This is one of several granaries now dated on Fiftymile Mountain that predates the late Pueblo II Anasazi occupation; on that basis, as well as style (freestanding), it is presumed to be Fremont. The storage/camp function with rock art is a Fremont pattern observed elsewhere (42GA4126, 42GA1066) – although it is also similar to granary/camp/rock art associations on Fiftymile Mountain that have corrugated ceramics.

42KA7192

M. Zweifel recently recorded and dated this granary on the Straight Cliffs overlooking Fiftymile Bench and the Escalante Desert. He describes the site as a single granary approximately 1.4 x 2.35m with a probable height of 1m. Construction is wet laid masonry and upright slabs with a well prepared mud floor. Twig fragments from the mortar yielded a date of Cal A.D. 880-990 (Beta-328998). As is the case for many granaries no pottery or artifacts were associated. The site's location about midway between the mesa top and Fiftymile Bench provides an intermediate setting in terms of agricultural potential, flora, and faunal resources as well as access to the Escalante Desert via Willow Slide.

42Ga4158, Birch Creek Shelter

This north aspect shelter is located along Birch Creek at an elevation of 6,600 feet. It appears to have been used for a limited range of activities. A skewered corn cob (14 row?) in direct contact with a basketry plaque (Figure 132) was radiocarbon dated, at 2 sigma, to A.D. 650 to 985 with a calibrated midpoint of A.D. 785 (Beta-107648). This date is one of the few available for this open coiled, one-rod foundation technique with intricate stitch (cf. Hewitt 1980:52). Typical basketry types found at the Alvey site include half, one, and two-rod and bundle techniques from Levels I, II and III; only a single specimen of spaced coiling, one rod, intricate stitch is reported from Level III (Gunnerson 1959:100-105) (see Fig 31a). At Cave du Pont on the Grand Staircase, (Nusbaum 1922) Kidder and Guernsey describe the technique for two unfinished fragments that “results in a very open but very firm and stiff weave, and it is probable that baskets so made were used as sifters”(Nusbaum 1922:97), (see Figure 19). Two similar basketry disks are described from Nine Mile Canyon over which two human scalps were stretched. Their construction is described as “open - or spaced coiled, intricate-stitch, interlocked on a one-rod foundation technique” (Howard and Janetski 1992:125). Although Morris and Burgh consider the technique a Basketmaker trait, it

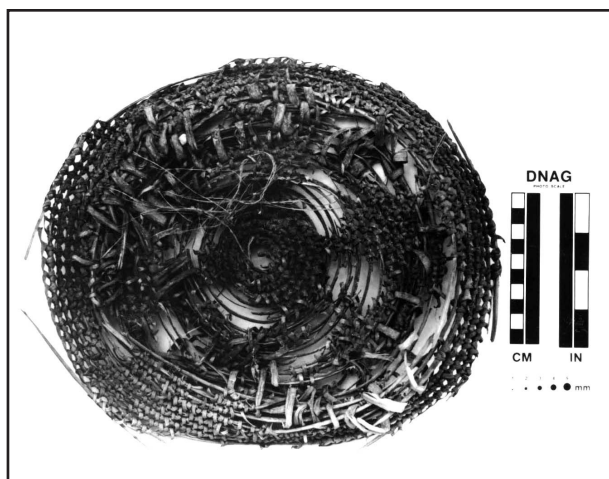


Figure 132. 42Ga4158, Birch Creek Shelter; open coiled basketry (note mending).

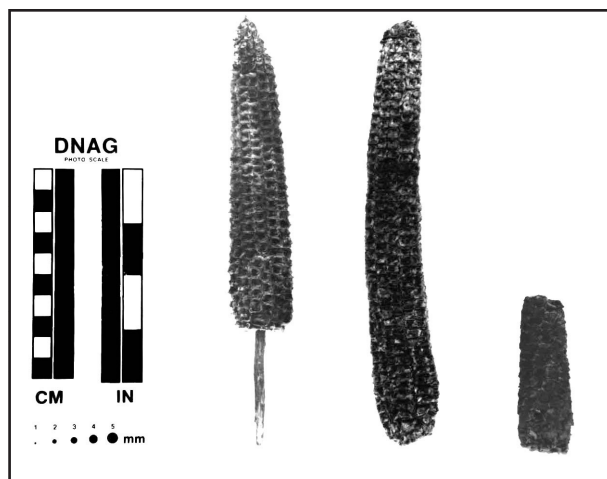


Figure 133. 42Ga4158, Maize from Birch Creek Shelter.

is found throughout Utah and is considered an indigenous technique at Cowboy Cave (Hewitt 1988:53). Gunnerson shows a photograph of a “spaced coil, intricate stitch” basket from the Davis Kiva site (Gunnerson 1959, Fig. 43). Lipe (1960) depicts a flat, “spaced coil,” basket from Talus Ruin that he describes as “definitely (was) associated with pottery of the Pueblo III period (Lipe 1969:192).

The radiocarbon date from 42Ga4158 was obtained from an artifact – a corn cob that had been skewered with a twig (Figure 133). Pierced corncobs are found in both Anasazi and Fremont contexts. Although no formal studies on the function or distribution of pierced corncobs have been conducted, they appear earliest on Fremont sites in the Escalante drainage. Fowler (1963:83) shows large, well-formed, cobs from Sheep Horn Alcove, Pantry Alcove, and Triangle Cave. Several are two cobs skewered by a single stick. Gunnerson found them in all three levels of the Alvey Site, although the majority were in Level II (Fremont) deposits (Gunnerson 1959b:92). The trait, or practice, continues during the Late Formative on “Anasazi” sites in the Glen Canyon region e.g. Talus Ruin (Lipe 1960), Level III of the Alvey site (Gunnerson 1959b). It is of interest that they are not reported in the Virgin culture area; their spatial distribution on the Monument is restricted to the Glen Canyon region where they appear to be part of a local Fremont-Anasazi sequence. Beyond the Glen Canyon they have been reported in late contexts. Kidder and Guernsey (1919) report several from Firestick Ruin where they found several mixed in with a large quantity of shucked corn (Kidder and

Guernsey 1919:36). These corn cobs generally seem to be well-formed specimens - skewering them may have been a means of tagging potential seed corn.

42Ga3907

This is an accessible granary situated in a shallow alcove in the headwaters of the Escalante River near the confluence of Upper Valley, Main Canyon, and Birch Creek. Construction is of heavily mortared and plastered masonry with a roof constructed of clay supported by riparian species beams and lighter closing materials. The access opening is via a clay coped opening in the roof, as well as a lateral entry through the side. The structure is relatively large volume with external measurements about 3m x 1.7m and a height of 1.1m. A small riparian twig, found in the matrix of roof clay, provided a 2 sigma range radiocarbon date of A.D. 875 - 1025 with a intercept date of A.D. 980 (Beta 93853). No artifacts are associated with the site. Several residential sites, without apparent storage, are recorded nearby.

42Ga4126

This site consisted of two small, free-standing, “top loading” granaries. Located in a short tributary of Calf Creek, the structures were situated on a north aspect ledge directly across the canyon from the Friendship Cove (42Ga1099) pictograph panel (Figure 142). In addition to its large and impressive anthropomorphs, 42Ga1099 displays structural and artifactual debris indicating that it was probably used on a seasonal basis. Although the possible

association of these two sites is speculative, close proximity of granaries and camps are a common pattern in the Escalante drainage.

The granaries were in pristine condition in 1996 (Figure 134). In 1997 one (F3) was totally demolished and pushed over the rim of the canyon, the second structure (F2) is still standing but was severely damaged by setting fire to its rat midden contents. The volume of both granaries was less than a cubic meter. A small diameter riparian twig obtained from the rubble of F2 was dated A.D. 775 - 1015 (Beta 106104) with an intercept of A.D. 895. This site provides the only date, at present, for an intensive but probably seasonal use of Calf Creek by the Fremont.

42Ga3660, Big Hill site

The Big Hill site is a south aspect rock shelter with an associated granary. It is located one kilometer from the Escalante River at an elevation of 6,200 feet. The granary is not easily accessible and can be described only as a fairly large masonry structure. The rock shelter displays evidence of fairly intense occupation. Badly disturbed, ashy deposits just outside the shelter were tested revealing a compacted occupation surface possibly representing the floor of a light habitation structure. There was no daub present or other indications of substantial architecture. Surface artifacts on the rather extensive

midden include two-handed manos, cores, hammer stones, ground stone fragments, chipped stone, a Rose Spring projectile point and abundant Emery Gray ceramics. A composite sample of small charcoal collected from the F4 surface yielded a 2 sigma date of A.D. 720 - 735 and A.D. 760 - 1005 with an intercept of A.D. 885 (Beta-93852).

Site function, beyond storage, at the Big Hill site is somewhat ambiguous. Although no substantial architecture is obvious, given the extent of the midden and evidence for at least a light structure, some form of extended residential use is indicated.

42Ga4507

This small masonry granary is located on the talus slope high above Alvey Wash at an elevation of 6,240 feet. It is situated near the base of a cliff in a crevice beneath a large boulder. It was initially investigated because it held the remains of an early 20th century burial - possibly placed there at a much later date. During the investigation of the human remains by the BLM, Garfield County Sheriff, and the Utah State medical examiner, a corn cob was collected from the rat midden fill of the structure. The cob yielded a radiocarbon age of 1070 $\pm$ 70; a 2 sigma calibrated range of A.D. 855 to 1055, A. D. 1090 to 1150 (Beta-125909), with a calibrated midpoint of A.D. 990. An additional undated granary is located nearby.



Figure 134. 42Ga4126, Calf Creek granaries.

42Ga3750 Lampstand Granaries

This site is one of the eight sites in the Lampstand cluster investigated under a GSENM cooperative agreement with Brigham Young University. It consists of a series of storage room remnants under the rim of the Chinle caprock (Figure 135). An uncharred corn cob from one of

the granaries yielded a two sigma date of A.D. 665-1005 with a calibrated midpoint of A.D. 865 (Beta-117938). This Early Formative period date calls into question the assumption that these storage rooms are associated with the Late Formative pueblos located on the rim above (Baadsgaard and Fergusson 1999). An alternative is that the cob is a result from an earlier, undetected, Fremont occupation.

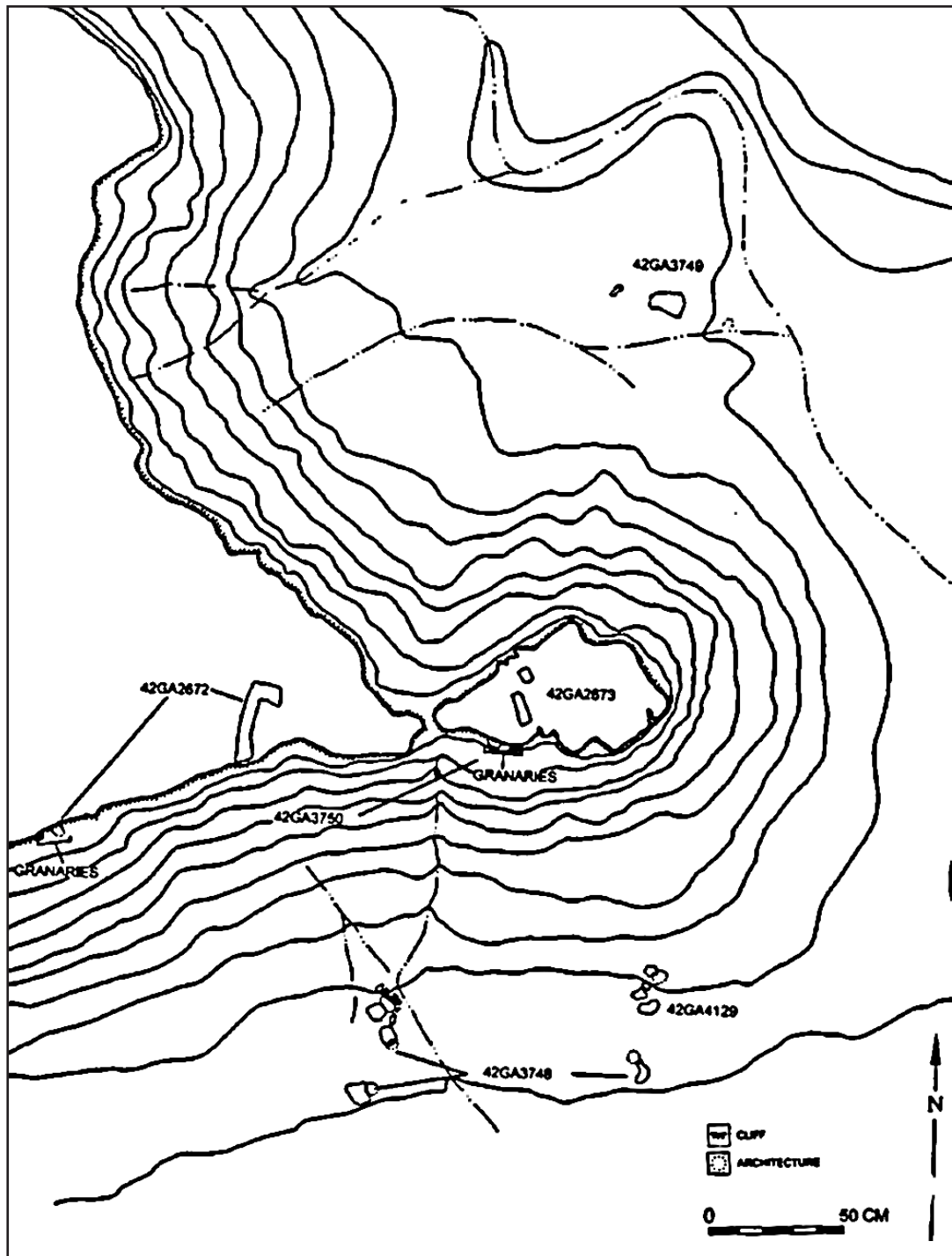


Figure 135. The Lampstand Site Cluster (Baadsgaard and Fergusson 1999).

42Ga3102 Apryll's Site (Jacklin1988)

This was one of several sites located north of the town of Boulder that were tested by the Dixie National Forest as part of the The Boulder Project (Jacklin et al. 1988). It provides evidence for Fremont occupation in the Boulder area preceding the Anasazi occupation at the Coombs Site.

The primary architectural feature at Apryll's Site was a rectangular alignment of basalt boulders that defined an occupation surface about 25cm below the present ground surface. A basin hearth was located in the northeast quarter of the floor. In plan, the structure is remarkably similar to that at the Spencer Site in Escalante (Figure 136) excavated by Gunnerson (1959). Charcoal collected from the floor of the structure yielded a conventional radiocarbon date of 1200 B.P. $\pm$ 60 (Beta-17182). The possibility exists that "old wood" was dated. Edible plant remains from the floor and hearth included a charred corn cob, pine nuts, juniper and *Chenopodium* seeds.

Fill of the structure produced a Parowan Basal-notched projectile point, Fremont ceramics identified as both Sevier and Emery Gray, manos, metate fragments, stone balls, a polishing stone, hammerstones, bifaces, scrapers, a drill and chopper. Mammalian remains included jackrabbit and possible mule deer (Jacklin 1988; 56).

42Ga4655 Sand Wash Shelter

This west aspect rockshelter holds the badly vandalized remains of 3 storage cists. It is located in a narrow but arable segment of a tributary to The Gulch at an elevation of 5,600 feet. It was apparently situated to take advantage of a seep located in the wash immediately below the site. Site architecture and the limited artifact assemblage of a milling stone, a core, and collectors pile of Emery gray sherds, suggest that the site functioned primarily as a storage cache.

All three cists were low volume (less than 1 cubic meter) and were probably constructed over a period of time. Cist #1 was a masonry and log construction built against the back wall of the alcove. Semicircular in shape, it was partially subterranean with an apparent dome-like superstructure. The construction of Cists 2 and 3 appears to have been somewhat expedient; both were masonry and partially slab-lined and constructed against rock faces. They abut one another and were probably built in sequence.

Emery Gray sherds piled next to the looted cists #2 and 3 indicate an Early Formative assignment for the site. The only maize cob observed on site yielded a 2 sigma calibrated date of A.D.405 to 570 (Beta 140954). Although tenuous, the association of ceramics and the corncob supports Geib's (1996) contention that ceramics were present in the Escalante drainage by about A.D. 500.

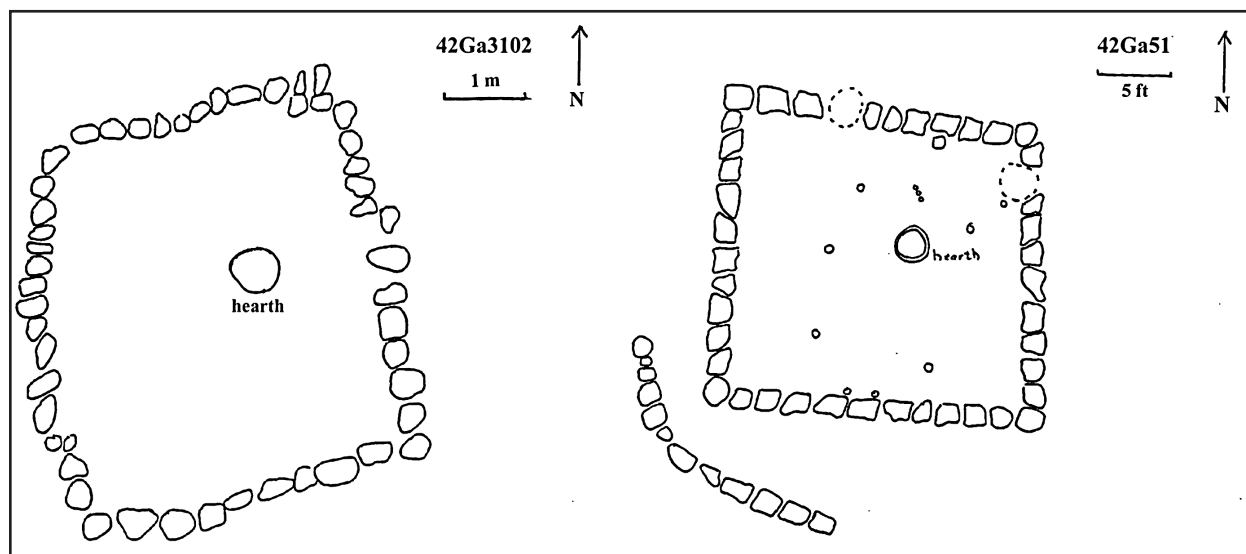


Figure 136. Surface masonry rooms: 42Ga51, the Spencer site (Gunnerson 1959); 42Ga3102, Apryll's site (Jacklin 1988).

42Ga3128 Deer Creek Shelter (Talbot et al. 2002)

This east aspect alcove overlooks rich riparian habitat of Deer Creek, a perennial stream flowing south from its headwaters on the Aquarius Plateau. The shelter lies along the Burr Trail 5 miles (7 kilometers) east of the Coombs site at an elevation 5,720 feet. County road maintenance activities disturbed the site in 2000 exposing over a meter of cultural deposits. Subsequently, Brigham Young University excavated the most intensively occupied portion of the shelter to mitigate the damage. While not a particularly large site at 2-3m deep, by 8-10m long, it yielded abundant and varied evidence for local hunting, foraging, and farming. In contrast to virtually all sheltered Virgin sites on the Grand Staircase, site structure at Deer Creek meets expectations for a truly mixed subsistence base.

Three strata representing as many occupations were identified; a minor Early Agricultural use associated with the lowest deposits (Occupation 1); a Fremont component accounted for the bulk of the deposits, artifacts and features (Occupation 2); and evidence for a possible late Fremont-Anasazi interface was identified in the uppermost level (Table 30).

The chipped stone assemblage was the largest data set on site and was best represented in the styel Occupation 2 stratum. It included projectile points, drills, scrapers, hammerstones, and cores. Projectile points included Formative types: Rose Spring (2) and Bull Creek (1) as well as a range of dart point types; Elko-Corner-notched (7), and a Gatecliff (cf. Gypsum) from Level 1. The oldest types recovered was a Sudden Side Notched found in the Occupation 2 deposits. A large amount of debitage

(18,763) and 17 cores indicate that the production of formal tools was a significant activity.

The ground stone assemblage was impressive as well and included: metate fragments (32) and five complete basin metates. Mano fragments (21) and thirteen complete specimens were recovered. The majority of manos were basalt (71). The authors point out that no trough metates or two-handed manos were recovered. This suggested to them that “vegetal food processing was focused principally on wild plant seed grinding, including saltbrush, goosefoot, ricegrass, pinyon, sunflowers, and cattail.”

The faunal collection consisted of 1,663 bones representing thirteen species dominated by mammals but including some reptiles, a few birds, and one fish ventral fin. Of the identified artiodactyl bone, both Mountain sheep (11) and Mule Deer (3) and “small” artiodactyl bone (72) were represented; Leporidae were represented by jackrabbits (24), Cottontails (57), and a rabbit/hare category (2). These numbers yield a relatively low Artiodactyl Index rating of .50 (see Table 27).

Domesticated species were represented by corn in the macrofloral record (note *Chenopodium* sp. seed as well) and a small amount of squash and maize pollen indicating local farming along Deer Creek. Given the weight of evidence for reliance on wild foodstuffs and little more than the presence of domesticates, the Deer Creek Shelter record may represent a good example of a truly mixed economy.

The total ceramic assemblage from Deer Creek Shelter consists of 79 sherds; Emery Gray (71), North Creek Gray (5), and North Creek Corrugated (3). As expected the dominant type is andesite tempered Fremont plain gray. The presence of a few Virgin series corrugated sherds in the upper levels confirms the suspected Late Formative

Sample No.	Provenience	Date	Cal 2 sigma	Cal 1 sigma
CAMS-74937	Charred pine cone scale, Occupation 1	1460+/-40BP	AD 537-659	AD 561-644
CAMS-74936	Five charred pine cone scale frags; F4, Occupation 2	1180+/-40BP	AD 722-977	AD 779-937
CAMS-74939	Corn cob from Occupation 2	890+/-30BP	AD 1036-1220	AD 1058-1210
CAMS-74938	Corn cob from Occupation 3 surface	860+/-40BP	AD 1039-1264	AD 1160-1221

Table 30. Radiocarbon dates from Deer Creek Shelter, 42Ka3128

radiocarbon dates (Table 20). The authors believe that their presence is a good indication that both the Anasazi and Fremont were present in the area during the Late Formative Period (Talbot et al. 2002). The nature of that relationship can't be addressed on the basis of a handful of sherds but the fact they are probably not from the Coombs Village is interesting; the closest source of North Creek Grayware is probably Fiftymile Mountain where Gunnerson suspected the Fremont and Anasazi came into contact.

BYU FIELD SCHOOL CONTRACTS AND COOPERATIVE AGREEMENTS

Background

Shortly after the Presidential Proclamation established the Grand Staircase-Escalante National Monument, Brigham Young University (BYU) and the Monument entered into a mutually beneficial cooperative agreement to investigate Formative Period sites in the Escalante basin. Initially the Lampstand Ruin cluster of sites was tested in 1997 (Baadsgaard and Fergusson 1999). In 1999 BYU inventoried 2050 acres in the vicinity (Talbot et al. 2000). In 2000 the field school conducted an additional 2080 acres in the area, as well as 3145 acres along and near Deer Creek (Baker et al. 2001). In 2001 the Department of Anthropology Field School conducted survey and excavations at Big Flat which is discussed below (Talbot and Jordan 2002). They also complimented Keller's (2000) inventory of the Escalante River canyon by working upstream from Calf Creek. In 2002 inventory and excavation focused on Main canyon, the Little Desert and Cedar Pockets (Baer and Sauer 2003). 2003, the final year of the cooperative agreement involved both survey and three excavations on the Monument (42Ga5167, 42Ga3144, 42Ga882) as well as two sites on private property in Wide Hollow; the Barnson site (42Ga5168) and Arrowhead Hill (42Ga5169) which continued into the 2004 field season.

In addition to the field school activities excavations the Office of Public Archaeology (OPA) carried out excavations at Deer Creek (42Ga3128), and Broken Arrow (42Ka4356) described elsewhere in this volume. Directed by Dr. Joel Janetski and

supported by the technical expertise of BYU's contract arm, OPA, a great deal of useful research was accomplished on the Monument during this period.

The inventory and excavation program was guided by common research interests in the Formative Period which were also the most visible and threatened archaeological resources on the Monument. BLM reconnaissance level inventory during the late 1980's and 1990's on Big Flat and elsewhere in the Escalante drainage documented a considerable number of Fremont pithouses including several dozen in the Big Flat area (McFadden 1997). In addition to pithouses, another prominent feature on the tract were slab-lined "roasts" in various contexts; some were associated with the pithouses, others were scattered among them. In combination with the apparent absence of storage features - highly visible elsewhere in the region, the proximity of mule deer winter range, the availability of fire wood, and a southerly aspect, a model of winter residence - part of a seasonally mobile strategy, was proposed for Big Flat. This model of Fremont settlement and subsistence model was addressed by two Master's theses to the benefit of both the students and archaeological research (see Harris 2009 and Schaub 2003).

The 2001 BYU field school conducted an intensive inventory of the Big Flat tract concurrent with the excavation of three previously recorded pithouse sites (Jordan and Talbot 2002). In addition, Megan Schaub (2003) tested 10 of 131 the slab-lined pits features on the tract as a Master's thesis project. Fill samples from each of the features was examined by Puseman and Cummings for pollen/starch and macrofloral remains. All four BYU investigations provided radiocarbon dates and are briefly summarized below.

42Ga3891, The Outpost.

The primary feature on site was a substantial, slab-lined pithouse with southeast oriented entry/vent shaft and slab-lined hearth. Tabular coursed masonry backed the slabs and in one area overlaid it. Stick impressed daub suggests a wattle and daub superstructure. Several slab-lined features and discrete ash stains were associated. Maize from the vent/entry yielded a date of A.D. 960 - 1040.

The faunal collection consisted of 283 fragments of which 245 were identified as Artiodactyls Only

one bone was identified as a lagomorph yielding a Artiodactyl index of .996. This is very high ratio of big game to rabbits and hares (See Table 27).

A second roughly circular, basin-shaped structure about 20 cm deep and estimated to be 3m in diameter was tested. The excavators suggest it was a temporary use structure such as a wickiup or ramada.

Of 113 sherds analyzed: 99 were Emery Gray; of 12 quartz sand tempered sherds, (8) Snake Valley Gray, (2) were North Creek corrugated, and (2) North Creek plain.

42Ga4086, Dos Casas

As the name implies, the primary features on this site were two pithouses with a slab-lined hearth in between them. Both had southeast oriented vent/entries. Some 50m south is a second activity area described as part of the site. Three radiocarbon dates were obtained from the features. Structure 1, the larger and more formal of the two, provided a date of A.D. 240-610 - a determination thought to be too early. Based on ceramics and architectural style the authors thought the structure might have been built during the late Formative. Structure 2, a smaller more modest structure, yielded a date of A.D. 960-1160 - apparently just prior to the Late Formative period. Activity area 2, dated A.D. 100-400.

The faunal collection yielded 239 Artiodactyl bones and 42 lagomorph bones yielding a relatively high A/L index of .851.

Of a total of 1185 sherds analyzed, virtually all pottery was plain gray. The vast majority were tempered with basalt (1159) 23 with quartz sand, eight were Snake Valley Gray. Five sherds representing 3 vessels were classified as North Creek Gray. The majority of rim forms were said to be straight with no eversion suggesting that Structure 1, or other features on site, could date to the early Formative.

42Ga4095, Roadcut

The primary feature on site was a shallow basin-shaped structure about 4 m in diameter damaged by a bulldozer on the south edge. A radiating series of beams and some adobe suggest a relatively substantial, perhaps, wickiup-like superstructure. The floor was compacted sand with several small pits and the remains of a relatively large, oval shaped,

slab-lined hearth. A post yielded a date of Cal. A.D. 660-900. A total sixteen sherds were recovered. All had a coarse quartz temper with some having pieces of igneous rock. Based on Phil Geib's descriptions they are thought to be representative of the early Formative in the Escalante River basin.

Slab-lined Pit Testing Program

Schaub (2003) provides four previously unreported dates from her M. A. analysis of slab-lined pits on Big Flat (Table 32). Many of these features were initially observed on or near Fremont pithouse sites (McFadden 1997). Extending back to the late Archaic the range of dates suggests a much greater temporal span than anticipated. Two similar thermal features are reported in this volume at Haymaker Bench Camp. The context and associations of the three dated features are reviewed below.

42Ga5088. This was the only Fremont Wide Hollow Phase feature dated (Table 32). Apparently a residential site with seven roughly circular slab features. The single pit excavated was circular, 1.35m in diameter, and 25cm deep. Fill was ash and charcoal, burnt adobe fragments, two Emery gray sherds. Macro-flora analysis revealed vitrified tissue thought to be *Hordeum* (little Barley grass)

42Ga5076. This is a small aceramic site consisting of a single slab upright feature, an associated soil stain, a single handed mano and a few flakes. The pit was about 75cm in diameter and 50 cm deep and partially slab lined. Contents included from four 'micro' flakes, *Pinus*, *Artemesia*, and *Juniperus* charcoal and 'vitrified' plant tissue. The feature was dated to the late Archaic period (Table 32).

42Ga4095 (Roadcut site). Circular pit 70cm in diameter and 35cm deep. Fill was stained sand with some charcoal. Pollen sample consisted of local P/J, grass, and *Cheno-ams*.

42Ga5095. The site consisted of a lithic scatter with a Elko Corner-notched point and some soil stain. The well-constructed slab-lined pit was circular measuring 92cm in diameter and 46cm deep. Lower fill was dense, very dark sediments with charcoal. Pollen analysis revealed local species used as fuel. Like 42Ga5076, it was dated to the late Archaic period (Table 32).

Discussion. Slab-lined pits on the benches above the Escalante River occur on sites ranging from

perhaps B.C. 500 to at least the Wide Hollow Phase. Distinguishing between the early and late forms appears to be difficult. Pit contents were largely fuel with little evidence of what was being processed. The early dates themselves are a useful contribution of additional chronometric data evidencing a late Archaic population just prior to the introduction of maize. Other than combusted charcoal (*Pinus*) the macro floral samples yielded few charred remains indicative of plant processing. Virtually no bone was recovered. No maize pollen was identified in the samples nor were any cob remains identified. This latter finding stands in contrast to hearth remains on the Grand Staircase.

During the field season of 2002 three additional sites were tested; two in Main Canyon (42Ga4167 and 1585) and 42Ga5167.

42Ga5167, Calf Creek Camp (Harris 2005)

This site was excavated in 2003 to test the Wide Hollow Phase model that proposed temporary camps should be associated with agriculture in the Escalante Canyon bottomlands. The site described as a large (180m x 50m) scatter consisting of fire-cracked rock, lithic debris and ceramics. Two depressions with soil stain were excavated: Structure 1 was an aceramic, shallow, roughly circular feature with various pits and apparent post holes but no hearth. It was interpreted as an informal shelter representing multiple short-term occupations. The second depression excavated was a 2x2m light soil stain covered with abundant fire-cracked rock. It was interpreted as an informal roast or hearth possibly used for cooking. Neither features were associated with ceramics. A date of A.D. 420-600 was obtained from sediment (in Structure 1?) (Table 31). Harris's comment that no ground stone was observed on the site is notable.

42Ga4167, Humming Bird Hill (IMACS site form)

Recorded by BLM, this site was recommended for testing by BYU under the cooperative agreement. The best defined feature was an apparent pithouse with a 2 meter slab-lined vent shaft oriented east-west with a 5 meter diameter stain on the west. Two additional pithouse possibilities were noted. Emery gray ceramics were scattered over the entire site. Its location on a bench with south aspect above Birch Creek was considered an ideal winter setting.

BYU excavated 3 structures during 2002 field season recovering abundant chipped stone and ground stone artifacts. An assemblage of 691 sherds included 588 Emery, 101 Snake Valley Gray, and 2 Snake Valley Black-on-Gray.

A radiocarbon date from the fill of the Structure 1 pithouse yielded a 2 sigma calibrated date of A.D. 1020-1205 (Table 31). The date is consistent with the lithic and ceramic assemblage and the absence of any Anasazi pottery.

42Ga1585, Overlook site (IMACS site form)

This site was previously recorded in 1978 on one of the Southern Coal Project sample units as a Kayenta site (Hauck 1979). The site form was updated in 1987 as part of a recon effort to identify Fremont sites in the Escalante area. Located on a prominent butte overlooking the Escalante Valley, it is one of the larger sites in the area with a half dozen major structural features, alignments, granary, and substantial midden deposits. It was selected as a suitable site for excavation under the BYU cooperative agreement and partially excavated in 2002.

Eight structures were eventually identified, two were excavated by OPA/BYU along with three extramural areas. Structure 1 was a boulder-lined pithouse, D shaped and 6 meters in diameter. It had two hearth and no evidence of a vent shaft (although much of the south half was not excavated). Structure 2 was a small, oval, boulder-lined pithouse about 3.5 meters in diameter and up to 55 cm deep (cf. 42Ga3144, Casa Pequena?).

Like other pithouse sites in the Escalante Valley southerly aspect, proximity to water, abundant fuel and mule deer range make the setting of overlook near ideal for a winter or year-round habitation.

Chipped and ground stone artifacts were abundant. Ten projectile points included Rose spring series (7), Parowan basal Notched (2), and notably a single Bull Creek. Ceramics recovered were both abundant and varied. Of the assemblage 90 percent were Fremont (including exotic Snake Valley and Ivie Creek Black-on-White) 6 percent was Anasazi grayware including Shinarump, Gray, North Creek gray and Corrugated Coombs gray. Redwares consisted of 45 sherds of Deadmans Black-on-Red (Tsegi Series?) and 6 San Juan Red Ware (Little Colorado Series?)

A radiocarbon date from Structure 1 yielded a 2 sigma calibrated date of A.D. 978-1155 (Table 31) placing the feature within the late Wide Hollow Phase or potentially the Late Formative. Late Pueblo II Anasazi pottery suggests at least some features on the site date to the Late Formative

period. Arrowhead Hill (42Ga5169), a Late Formative Anasazi pithouse site, is located directly across the river and may have been contemporary with Overlook. In other respects the sites exotic butte top setting, structure types, and layout is typical Fremont.

Site No.	Control No.	Material	Context	Conventional C14 BP	* 2 sigma range
42Ga3891 Outpost	Beta 159900	corn	Structure 1 vent	1030+/-40	AD 960-1040
42Ga4086 Dos Casas	Beta 159902	wood	Structure 1,hearth	1630+/-80	AD 240-610
42Ga4086 Dos Casas	Beta 159901	charcoal	Structure 2, Pit 1	1010+/-50	AD 960-1160
42Ga4086 Dos Casas	Beta 159903	charcoal	Activity Area 2, hearth; 30m south of Structure 1	1780+/-60	AD 100-400
42Ga4095 Roadcut	Beta 159904	wood	Structure 1, Post hole 1	1250+/-60	AD 660-900
42Ga1585 Overlook	171923	charcoal	Structure 1	1010+/-40	AD 978-1155
42Ga42Ga4167 Humming Bird Hill	171924	charcoal	Structure 1 fill	940+/-70	AD 1020-1205
42Ga5167 Calf Creek Camp	255667	sediment	Structure fill	1550+/-40	AD 420-600

Table 31. Radiocarbon dates from Big Flat excavations (Brigham Young University)

Site No.	Control No	13C/12C ratio and material	Context	Conventional C14 BP	Cal 2 sigma range BC
42Ga5076	Beta-178857	-25.0 charred	-	2520+/-80	Cal BC 820-400
42Ga5095	Beta-178858	-25.0 charred	-	2430+/-70	Cal BC 790-380
42Ga5088	Beta-179652	-25.0 charred	-	1290+/-50	Cal AD 650-870

Table 32. Radiocarbon dates from slab-lined pits on Big Flat (from Schaub 2003).

LATE FORMATIVE PERIOD SITE DESCRIPTIONS

42Ga3138 Horse Canyon Rockshelter

Horse Canyon Rockshelter was extensively tested as part of the BLM's Burr Trail mitigation project (Tipps 1991). It is a small southeast aspect, stratified shelter at the upper end of Horse Canyon at an elevation of 5,880 feet. The shelter held 1.3 m of stratified deposits which ranged from Late Archaic through the Late Prehistoric Periods (Appendix A). Twenty-one features were excavated in five strata, three were dated. Hearth 5 in Stratum 4 yielded a radiocarbon age of 770+/-60 B.P. (Beta-1280). The 2 sigma range provided from Beta Analytic is A.D.1175-1305 with a calibrated midpoint of A.D.1270. Although no cultural affiliation could be assigned, the late date suggests continued occupation of the area in the Late Formative.

42Ga3123 Steep Creek Quarry

This site was tested as part of the Burr Trail mitigation project (Tipps 1991). It consists of an extensive lithic procurement site and a camp which may or may not be associated. An unlined basin hearth, one of the three hearths identified on site, was tested. It yielded a radiocarbon date of 770+/-70 B.P. (Beta-20670). The 2 sigma range provided by Beta Analytic was A.D. 1165-1310, 1355-1385 with a calibrated midpoint of A.D. 1270. A Cottonwood Triangular point found in association with the hearth suggests the possibility of Pauite cultural affiliation.

42Ga3128 Deer Creek Shelter (Talbot et al. 2002)

The uppermost stratum on this site relating to Occupation 3 held both Virgin Anasazi and Fremont ceramics as well as a Bull Creek projectile point. A corn cob from the surface yielded a 2 sigma date of A.D. 1039-1263; no C12/13 measurement provided. (See the Wide Hollow Phase sites for the complete site description.

Anasazi ceramics on this otherwise Fremont site suggested to the authors that while the Anasazi sherds could represent a limited post-Fremont

Anasazi presence, that Coombs Village is just a few kilometers to the northwest, the pottery could have as easily been a result of trade – that is to say contemporary.

At any rate, we might expect local Coombs Variety pottery at Deer Creek Shelter rather than Virgin series. A review of Virgin series pottery and its prevalence at Coombs would be helpful in this regard. Virgin sherds are widespread in the region and are reported in the Escalante area (Keller 2000, 2001; Harris 2005; Jordan and Talbot 2002), at the Alvey site (Gunnerson 1959b; Geib 1996), and on Fifty-mile Mountain (Gunnerson 1959a).

42Ka172 Alvey Site, Level III (Gunnerson 1959b)

Geib provides a single radiocarbon assay from a 12 row maize cob that is consistent with the Pueblo II Anasazi decorated and corrugated wares from this level (Geib 1996:88). The cob was collected from a thick vegetation layer originating in Level III at approximately 0.76-1.02m. (Geib 1996:86). The cob yielded a 2 sigma range of A.D. 885-1279 with a calibrated midpoint of A.D. 1032 (Beta-34943) (Table 29). While the midpoint appears to be too early for the introduction of corrugated ceramics which don't appear in the Kayenta region until after A.D. 1050, the range easily allows for a late Pueblo II or PIII date.

The sole architectural feature on site was a "D" shaped masonry "house" constructed against the back wall of the shelter. Maximum inside measurements were 7.5 feet against the back wall and 6.5 feet front to back. The floor was sandy adobe over the vegetative detritous below. A central, unlined basin about 2 feet in diameter was filled with ash and charcoal (Gunnerson 1959b:56). While better constructed, this habitation is reminiscent of both earlier Fremont sheltered camps as well as sheltered Anasazi rooms. Given the northerly aspect it is assumed to be a temporary habitatoin.

Level III accounted for the vast majority of pottery recovered from the site (n-419). White, gray and orange wares were late and mostly assigned to Kayenta types although North Creek

Gray (n-115) and North Gray Black-on-Gray (n-17) were represented. It is perhaps notable that no Middleton Red Ware (Shinarump Red) was reported while Tsegi Orange Ware was relatively abundant (86). Fremont types were restricted to two of Gunnerson's Escalante Gray (Emery Gray) sherds.

**42Ga3244 Mafeetahot
(Jacklin et al. 1988)**

A badly damaged, one room, rectangular structure constructed of jacal was tested on this site as part of the Dixie National Forests "Boulder Project." The site is one of a series of small Fremont residences located a short distance north of Boulder Utah. Elevation of the site is 6,860 feet. A charcoal sample from a possible wall post yielded an uncorrected date of 750+/-70 B.P. (Beta-22453). A second composite sample of charcoal from the floor yielded an uncorrected date of 790+/-50 B.P. (Beta-22454). Four Anasazi sherds from the fill, including 3 Coombs Variety Tusayan Corrugated and one Garfield Black-on-White, suggest the site was contemporary with the nearby Coombs site (42Ga34). The Mafeetahot dates (Table 33) are quite late and at this point considered only suggestive.

Floral analysis at Mafeetahot identified domesticated macrobotanical remains i.e. maize cobs and kernels. No maize pollen was recovered. The analyst observed "The total lack of pollen from the species at any of the sites clearly indicates they were not growing or doing any long-term storage

of the resource at the sites" (Heath 1988:93). While the lack of economic pollen species recovered does not necessarily prove that the species did not grow in the area, it is noted that the observation is congruent with a settlement-subsistence model that hypothesizes that Fremont residences in the uplands were located to take advantage of big-game hunting opportunities during the winter, rather than agriculture during the summer (McFadden1996, 1998).

**42Ga43 Rattlesnake Point
(Gunnerson 1959b)**

Hurriedly excavated and briefly reported by Gunnerson (1959b), this small Fremont pithouse site may yet have important contributions regarding the issue of Fremont-Anasazi contemporaneity.

The Rattlesnake Point site is located on a terrace above Alvey Wash, at an elevation of 5,940 feet, about one mile south of Escalante. The site displays an obvious excavation about 6 meters in diameter, presumably Gunnerson's pithouse, and several uprights and stain that indicate a second structure of some sort. The pithouse was badly vandalized prior to Gunnerson's work but is described as a circular pit 18-20 feet in diameter and 20" deep on the upslope side. It was lined with slabs and had a rock and adobe partition on the east side (Figure 137). No hearth was described - probably a result of being destroyed by looting.

Pottery included: Black Mesa Black-on-White (10), Escalante Gray (219), North Creek Gray (7), snake valley Gray Ware (5) and San Juan Red Ware

Site #	Laboratory Number	C14 (B.P.)	2 Sigma Range	Cal. Curve
42KA172 (1)	Beta 34943	970+/-100	A.D. 885-1279	A.D. 1032
42GA3244 (2)	Beta 22454	790+/-50	A.D. 1159-1294	A.D. 1261
42GA3244(2)	Beta 22453	750+/-70	A.D. 1213-1410	A.D. 1290
42Ga882	Beta 165413	950+/-60	A.D. 990-1220	A.D.1040
42Ga882	Beta 165414	1080 +/-80	A.D. 780-1060	A.D. 980
			A.D.1080-1150	

Table 33. Late Formative Period radiocarbon dates from the lower Escalante and Boulder localities.

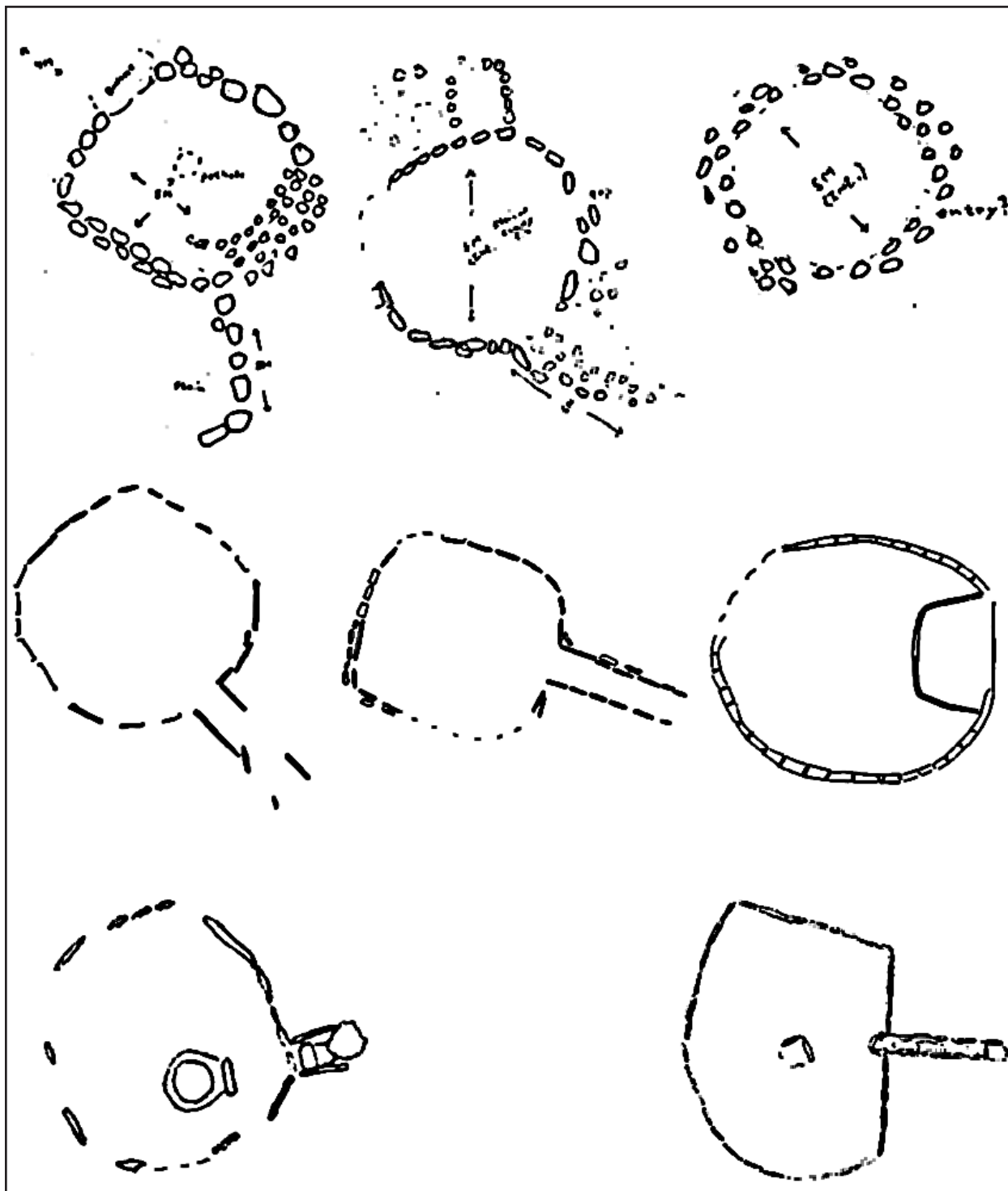


Figure 137. Pithouse plans from the Kaiparowits / Escalante Region. A, B) 42Ga1585 (Escalante Valley). C) 42Ka4356 (Fiftymile Mt.) D) 42Ga4113 (Big Flat) E) 42Ga3891 (Big Flat) F) 42ga43 Rattlesnake Point (after Gunnerson 1957 feature notes) G&H) 42Ka524, Golden Stairs Site (after Fowler's 1961 Feature notes).

(2) that Gunnerson thought were likely Middleton. The absence of any corrugated pottery is notable, however if the Anasazi is non local and the red ware is actually Middleton, the case might be made that the site dates well into the Late Formative period.

Gunnerson (1959b:33) illustrates several Black Mesa Black-on-White sherds found on site. Geib (1996) has recently studied the excavation feature notes and reviewed the collections. He concluded that while the sherds were “good Black Mesa” (Phil Geib personal communication 1999) they were found in the fill rather than in good floor context and are therefore suspect. Gunnerson stated “All of the sherds collected from the site have been considered together since there was uncertainty as to what was disturbed and what was undisturbed in the excavation. Also, there was no obvious evidence of more than one occupation” (Gunnerson 1959b:34).

The site was recently relocated (1999) and the site form updated (IMACS site form 42Ga43). While the questionable context of the Anasazi sherds is well taken, this is a very small site located in an area where Anasazi pottery is not common - it seems unlikely that they were introduced after the site was abandoned. An apparent second structure identified in 1999, could represent a slightly later occupation and therefore could have been the source of the sherds that were subsequently dumped in the fill of the abandoned pithouse. Even so, if a later occupation occurred, it too was likely Fremont given the relatively minor evidence for an actual Anasazi presence on site and in the Escalante Valley.

Postscript: This site is on private land and was not covered under the cooperative agreement between BYU and the GSENM, however, the site was investigated once again by BYU in 2003. Two dendro dates of 1000 $\pm$ and 1007 $\pm$ and a C14 date of A.D. 1220-1427 on corn all obtained from the Structure 1 vent (Personal communication Joel Janetski 2012). The very late date suggests a Pueblo III occupation, whether the date was supported by PII/III pottery is not known at this point.

42Ga51 The Spencer Site (Gunnerson 1959b)

The Spencer Site is situated on a low ridge 10 meters above the alluvial floor of the Escalante River. Although Gunnerson initially considered it

to be a Virgin Anasazi site, based on the presence of Escalante Gray and North Creek Gray ceramics (Gunnerson 1959:7), it is here considered one of many Fremont residential sites recorded in the Escalante Valley. 42Ga51 lies about 4 kilometers north of the Rattlesnake Butte site at an elevation of about 5,900 feet. The square configuration and masonry construction at this site markedly contrasts with the architecture at Rattlesnake Butte but is not unlike numerous square to round masonry “pitstructures” in the immediate area. The association of late Pueblo II Anasazi ceramics with the dominant type Escalante Gray, (now considered Emery Gray) in the fill of the latest structure, make it an important site for considering Anasazi-Fremont contemporaneity during the Late Formative Period.

Excavation

Investigations at the Spencer Site focused on exposing a 22 feet square burned “pithouse” that was about 2 feet deep (House 1) (Figure 136). It was constructed of large dry laid boulders with plastered interior walls. A lengthy period of use was suggested by numerous floor/use surfaces; the hearth had also been rebuilt. Although this was apparently the latest structure on site, it is remarkably similar in plan to the Early Formative structure excavated at the Apryll’s Bench Site 42Ga3102 (Figure 136) (Jacklin 1988). Charcoal from the floor of the 42Ga3102 structure yielded a calibrated radiocarbon date of A.D. 687-989 with a midpoint of A.D. 895 (Beta 17182). Although this was a surface room, it suggests a continuity of structure form between the Early and Late Formative Periods.

Gunnerson also noted an underlying, presumably structural, deposit upon which House 1 was built that yielded only plain gray ceramics. Although he did not have time to investigate it, he recommended that “Additional work should be done at the Spencer site not only to determine the nature of the structure (if any) under House 1, but also to determine whether it is actually devoid of corrugated pottery as suggested by the sample herein reported” (Gunnerson 1959:29).

Ceramics

42Ga51 was the type site for Escalante Gray (Gunnerson 1959:23). Gunnerson noted that the type only superficially resembled Turner Gray Variety II in that it displayed rare painting and

that surface manipulation, such as incised lines, punctation etc, were entirely lacking (Gunnerson 1959:24). Elsewhere Gunnerson states his opinion that “Escalante Gray and Escalante Black-on-gray should be included in Tusayan Gray Ware” (Gunnerson 1959:360). Although both temper and paste differ dramatically from the Virgin series, the everted jar rims at the Spencer site (see Gunnerson 1957:25a,b) are nearly identical to those being produced throughout the Virgin region during the Early PII Period A.D. 900-1050/1100 (see Dalley and McFadden 1985:152-153; Dalley and McFadden 1988:237-238; Aikens 1965:94). Other rim forms (Gunnerson 1959; 25e,) are similar to those recently described at the BMIII/PI Park Wash site (see Figure 48).

Ceramic Context

The Spencer Site provides a good context for considering the actual association of Fremont and Anasazi ceramics in the upper Escalante drainage. As was the case at Rattlesnake Butte, however, the late Anasazi ceramics were found in the fill of the structure rather than in good floor context. A small assemblage of Black Mesa Black-on-White (1), Tusayan Black-on-Red (1), Tsegi Orange Ware (1), Middleton Black-on-Red (1), and Tusayan Corrugated (3) were found between the floor and 6” above (Gunnerson 1959:22); additional late sherds were found in the general fill and on the surface. The total late PII Anasazi assemblage amounted to 35 sherds representing perhaps 9 vessels. Gunnerson stated that two corrugated sherds were apparently locally manufactured noting that they contained igneous temper (Gunnerson 1959:27). These sherds may have represented the then undefined type now known as Coombs Corrugated. Snake Valley Gray (25) and Black-on-Gray (17), (Pueblo II period types?) were represented throughout the deposits of the site. Escalante Gray sherds (633), however, dominated the collection. Gunnerson was not convinced that the late ceramics were actually associated with House 1: “It is interesting to note that no corrugated pottery was found below the floor of House 1 and that only three corrugated sherds, which fit one another, came from the lower portion of the fill. This evidence, though far from conclusive, suggests that corrugated pottery was not introduced at the site until after the abandonment of House 1.”(Gunnerson 1959:27).

And so it goes, demonstrating true association of Anasazi sherds in good Fremont structural contexts was not achieved by the early University of Utah investigations, nor has it been since. What seems apparent, however, is the consistent presence of small amounts of Late PII Anasazi pottery on some otherwise Fremont sites.

42Ga3144 Casa Pequena

This small structural site was recorded during the Little Desert intensive survey conducted by the BYU field school during the 2003 field season (Harris 2005). Although it was not directly dated it is included here as a potential late Formative site based on a mixed ceramic assemblage consisting of Fremont types (66%, n-302) and Anasazi (28%, n-127). The Anasazi assemblage included: Virgin Black-on-Gray, North Creek Gray, Tusayan Black-on-Red, and Coombs gray. Seventeen of the sherds were corrugated. Thirty-seven sherds “within” Structure 1 were Anasazi, 114 were Fremont. The assemblage and their relative numbers were interpreted as a short-term, possibly seasonal Fremont occupation followed by light subsequent Anasazi use. The site typifies the propensity for researchers to view such ceramic assemblages in the area as representing discrete points in time and therefore sequential occupations.

Casa Pequena is located on a promontory overlooking Alvey Wash about .4 mile away. The single architectural feature on site is a rectangular to oval room 2.5m x 3m. with an associated midden. Walls were constructed of both masonry and jacal. The floor was not prepared. Floor features include a hearth in the northwest corner and a bin in the southwest corner. No storage features were identified on site. The structures location and associated midden and artifacts suggested to the author a seasonal occupation focused on the flat valley lands below.

Taken at face value, the “mixed” Fremont and Anasazi ceramic assemblage, the lack of onsite storage (atypical of an Anasazi site) and apparent dry farm setting (atypical of the Fremont farming strategy), Casa Pequena represents the difficulty of assigning cultural affiliation to several sites in the Escalante Valley during the initial phase of the Late Formative Period.

42Ga882 Rich's Rock Shelter

Rich's Rockshelter, as recorded by Richard Fike in 1973 consists of a two- room granary on a ledge above the canyon and a rock shelter in the canyon below – an association similar to the previously described Big Hill site. They may well be associated but should be assigned separate numbers; 42Ga882 designates the rock shelter.

This south aspect shelter is located on the Kaiparowits Plateau. Its setting is a narrow tributary to Alvey Wash that heads on Camp Flat, at an elevation of 6,600 feet. It displays abundant ground stone, a few red pictographs, Emery Gray ceramics, and two corrugated Anasazi sherds. Although disturbed, it has potentially early, stratified deposits exposed in looters pits. In all regards except the few corrugated sherds, i.e. the camp-like nature of the site, the nearby granary, and the artifact assemblage, the site appears to be Fremont.

The two radiocarbon date assays were obtained from corn cobs located on the surface of the site. FS -1 is a 14 row, irregular cob measuring 70mm x

25 mm. The two sigma calibration is Cal A.D. 990 to 1220 (Beta-165413) with an intercept date of Cal A.D. 1040. FS-2 is also a 14 row, tapered cob measuring 50 x 20 mm. The two sigma calibration is Cal A.D. 780 to 1060 and Cal A.D. 1080 to 1150 (Beta-165414) with an intercept date of Cal A.D. 980. The flat calibration curve between A.D. 1040 and 1150 suggests that the cob could easily date to the 12th century.

Rich's Rock Shelter fits the proposed model for Fremont seasonal mobility very well. The shelter has no permanent structures and was apparently used as a camp during the Wide Hollow Phase and possibly earlier during the Late Archaic (note Archaic points were also recovered at Deer Creek Shelter). The presence of corn cobs, abundant milling slabs, and the probable association of the nearby granary in a setting with agricultural potential suggests a summer agricultural/foraging base camp. The two radiocarbon dates offer the possibility that occupation of the site extended into the Late formative Period.

THE FREMONT TEMPORAL FRAMEWORK

The Early Agricultural Period (Escalante Phase, ca. A.D. 100 – A.D. 500)

The introduction of maize to the Escalante drainage marks the beginning of the Escalante Phase; the phase terminates with the advent of pottery manufacture (Schroedl 1991:12). These horizons represent significant culture change, they are archeologically recoverable and unambiguous. Additional material culture traits include the pithouse and the introduction of Rose Spring arrow points. Although the Escalante Phase temporal span is similar to the Basketmaker II period of the Grand Staircase, the cultural implications of that term make it preferable to define a separate phase for the geographic area that eventually is assigned to the Fremont tradition. Schroedl's Escalante Phase will be retained for that purpose with modification to the beginning and ending dates based on recent radiocarbon dates (Figure 138).

Of the five sites reported here that date to the Early Agricultural Period, only the Alvey Site yielded unambiguous evidence for maize

(Geib 1996). The other sites represent upland pithouses (42Ga2557, 42Ga3132), an open camp (42Ga3743), and a shelter (42Ga3591). These sites tend to support the forager end of the “farmer - forager” continuum rather than an agricultural based subsistence.

The earliest evidence for local agriculture is reported from Triangle Cave and the Alvey Site in the Escalante River drainage (Geib 1996; 58). Geib suggests that, although earlier dates will likely be occur, maize is best dated to the “first few centuries A.D.” (Geib 1996:60) (See Table 29). Geib's assessment for the earliest use of corn is supported by a recent array of C13/12 corrected maize dates from sheltered sites upstream in the Monument (Table 34, Figure 139) (Keller 2000).

Descriptions of the dated sites are in the survey report (Keller 2000) which was carried out under contract with the GSENM in an effect to both identify and monitor significant sites in this popular hiking corridor. The dates were run with additional funding as a research effort to support the development of the chronology proposed here (one

Cal. Years	San Rafael Fremont Phases	Temporal Periods (Geib 1996)	Escalante Region (Schroedl 1991)	Suggested GSENM Phases
1200		Late Formative		Late Formative
	Bull Creek		Late Formative	-----
1000				
	Muddy Creek	Early Formative		Wide Hollow Phase
800				
	Proto-Formative			-----
600				
			Escalante Phase	Escalante Phase
400				
200		Early Agricultural		
	Late Archaic	↓		-----
AD/BC	↓	to 400 BC		

Figure 138. Fremont Chronologies.

Site #	Laboratory Number	C 13/12	Material	BP age	2 Sigma Range	Cal. Curve
42Ga1541	Beta 134608	-9.5	corn cob	1230±60	AD 670-965	AD 780
42Ga1541	Beta 134609	-9.9	corn cob	1030±70	AD 880-1170	AD 1005
42Ga4518	Beta 134610	-8.7	corn cob	950±80	AD 965-1255	AD 1040
42Ga4521	Beta 134611	-10.1	corn cob	1610±120	AD 140-660	AD 430
42Ga4536	Beta 134612	-10	corn cob	1760±80	AD 80-435	AD 255
42Ga4538	Beta 134613	-9.7	corn cob	1490±70	AD 420-670	AD 585
42Ga4540	Beta 134614	-10.6	corn cob	1610±40	AD 385-545	AD 430
42Ga4542	Beta 134615	-10.4	corn cob	1650±70	AD 240-560	AD 410
42Ga4543	Beta 134616	-9.8	corn cob	1590±80	AD 260-635	AD 440
42Ga4561	Beta 134617	-9.6	corn cob	1520±80	AD 390-665	AD 550
42Ga4561	Beta 134618	-9.9	corn cob	1500±80	AD 405-670	AD 570
42Ga4561	Beta 134619	-9.6	corn cob	1320±70	AD 615-875	AD 680

Table 34. Radiocarbon dates from the Escalante River Canyon (Keller 2001).

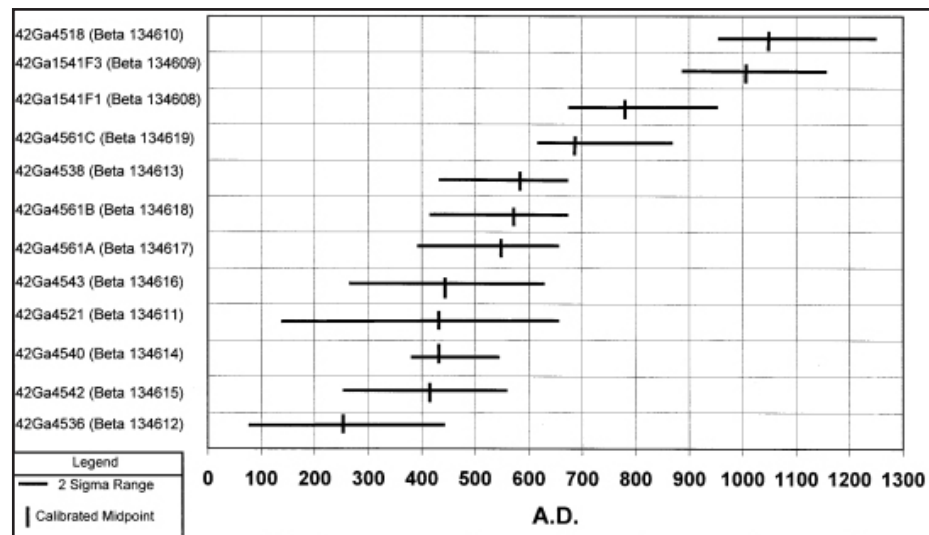


Figure 139. Radiocarbon dates from the Escalante River Canyon (reported in Keller 2000).

of several fruitful, collaborative projects carried out by Keller on BLM and Monument lands).

The Escalante Phase as "Proto-Fremont"

As Janetski has recently pointed out: "In contrast with the earlier views of Morss (1931), Jennings(1978), and Marwitt (1986) who maintained that Southwestern influence on the Fremont area began in Basketmaker III times or about A.D. 500, the data demonstrate that such influence began before the time of Christ" (Janetski 1993). Although no common origins are necessarily implied, the dates provided here for the introduction of maize are remarkably close to those for the Basketmaker II period on the Grand Staircase

(Figure 3). Geib and Bungart (1989), advancing the concept of a "Proto-Fremont" somewhat analogous to a local Basketmaker stage, point out {citing Wilde and Neuman (1989)} that maize preceded the introduction of ceramics and that "...the bow is another aspect of the Proto-Fremont lifeway on the northern Colorado Plateau" (Geib and Bungart 1989). At the same time, Basketmaker II populations south of the Colorado River continued to use the dart and atlatl. They feel that these differences in tool kits are evidence for diffusion of maize to in situ Archaic populations, rather than migration of a BMII population from the south.

Certainly there is ample evidence for indigenous Archaic populations who could have selectively

adopted the Basketmaker II traits that served them and rejected those less functional - a sort of selective diffusion. Apart from the culture historical data, which will eventually sort out the migration - diffusion controversy, settlement patterning for the Basketmaker II period ca. B.C. 100-A. D. 300 on the Grand Staircase - as exemplified by the Reservoir site (Frank et al. 1998), Cave du Pont (Nusbaum 1922), and South Fork Indian Canyon (42Ka1576), is similar to that described for the Escalante drainage Fremont; i.e. isolated storage facilities located near the damp, arable alluvium of canyon bottoms, and separate pithouse residences located elsewhere.

It is tempting to present the Escalante Phase as a contemporary adaptive counterpart to the BMII period on the Grand Staircase. At this point there is insufficient data to support that scenario. There is, however, abundant evidence for this type of settlement during the period A.D.700-1050 in the Fremont area. It is not clear at present whether the pattern actually began during the Escalante Phase. If this proves to be the case, the BMII occupation on the Grand Staircase and the Escalante Phase of the Fremont may have had very similar settlement-subsistence systems.

The Early Formative Period (Wide Hollow Phase, A.D. 500 - 1050)

The Early Formative Period is defined by the introduction of pottery (Geib 1996). Among the earliest ceramics reported from the Escalante drainage are Snake Valley, Emery Gray, and a sand tempered type from Level II of the Alvey site (Gunnerson 1959). Based on his 800 year maize radiocarbon date sequence, Geib suggests that ceramic technology was introduced to the area sometime between A.D. 400 and 550 (Geib 1996:89). This estimate is based on Emery Gray sherds from Pantry Alcove that were associated with two fifth century maize dates; the average of these two dates at the one sigma range is A.D.402-536 with a calibrated midpoint of A.D.429 (Geib 1996:89). Additional support for the circa A.D.500 introduction of basalt tempered ceramics comes from 42Ga4655, Sand Wash Alcove. A single maize cob from this small storage site yielded a two sigma calibrated range of Cal. A.D. 405 to 570 (Beta 140954). While the Escalante River

maize-based sequence may shed additional light on precisely when ceramic production began, it is increasingly clear from the two 800 year sequences (Geib 1996:87) and Figure 138) that ceramics are simply inserted into an otherwise uninterrupted continuum of occupation in the Escalante drainage. Regardless of their possibly minimal adaptive significance, Emery Gray ceramics dominate the local assemblages until sometime after A.D.1000 when Pueblo II Anasazi pottery is introduced.

In Schroedl's sequence, the late Prehistoric Period (A.D.700+/- to A.D. 1300) marks the period corresponding in time with both Fremont and Anasazi ceramics (Schroedl 1991:18). Because of the lack of dated sites with only Fremont ceramics, Schroedl chose not to identify a purely Fremont phase in his Escalante sequence. The new term, Wide Hollow Phase, is suggested here to represent sites in the Escalante drainage that display Emery grayware and that have been directly dated to the period A.D.500-1050. By A.D.1050/1100 the sudden introduction of Anasazi traits i.e. Bull Creek Points, ceramics, unit pueblos, deep pithouses, and a reliance on dry farm agriculture marks the beginning of the Late Formative Period; the preceding Wide Hollow Phase, which lasted over 500 years, can be defined as the period during which Fremont material culture dominated.

The Wide Hollow Phase; a definition

The Wide Hollow Phase is defined as the period when "Fremont" ceramics appear in the Escalante drainage, agriculture contributed significantly to diet, and the patterning of settlement, and residential architecture, even if seasonally occupied, became standardized. Subsistence practices and diet are not an integral part of the definition. As Madsen and Simms (1996) have stated it, farmer-foragers and forager-farmers formed a continuum of adaptive behavior over much of the inter-mountain west. Through the late Archaic and well into the Formative Period this variability persisted through time as well as space, not only for social groups, but probably individuals as well. While Madsen and Simms' general model of behavior accounts well for the highly variable and confusing archeological record of the "Fremont Complex," it does not appear to be the most precise model we can apply to the Escalante drainage data. The patterns of subsistence and settlement emerging in

the site distributional data of the Escalante drainage presented here suggest that they were not simply the result of random choices made by individuals, but were influenced by a well-defined, shared, adaptive strategy.

Wide Hollow Phase Settlement Patterns

The distribution of pithouses and isolated granaries during the Wide Hollow Phase (Figure 140) suggests that Fremont adaptation during this period involved seasonal movement between farming locations in the canyons and winter residential sites in the uplands that were near big game winter ranges. Numerous pithouse sites (Figure 137 a, c, d, e) with little or no evidence for on-site storage occur in the Escalante area including: Wide Hollow, Big Flat, Cedar Pockets, Fiftymile Bench, and Fiftymile Mountain. This suggests that mobility was integral to the pattern and was a long-lived, wide-spread adaptation in the Escalante drainage and surrounding uplands (McFadden 1996, 1998).

Mortuary Practices. The effect of a relatively mobile settlement structure on mortuary practices has received little attention in the study area. Variation in the location, style, and content of burials has social implications beyond those of individual behavior. Burial practices of the “Fremont Complex” vary widely from primary interments at sedentary village sites e.g. Parowan Valley (Marwitt 1970; Dodd 1982), to the total absence of burials at village-sized sites such as Five Finger Ridge (J. Janetski personal communication 2000).

Human interments attributed to the Fremont have rarely been encountered in the Escalante drainage. Two sites 42Ga3118 and 42Ga1006 have produced evidence of secondary burials. 42Ga1006, a shelter thought to have a lengthy Fremont occupation, however, also has rock art and pottery attributed to a late Numic presence. 42Ga3118 in Calf Creek, with in view of 42Ga966 (Figure 152) is simply unassociated remains in proximity to dated Fremont sites. Gunnerson (1959) reported partial human remains in association with apparent *Olivella* sp. at the 42Ka172 - a site which also displays charcoal equestrian figures. The contexts for all three are ambiguous.

On Fiftymile Mountain the only human remains documented are from 42Ka5903 (this volume) and purported “BMII” remains reported by

the Rainbow Bridge-Monument Valley expedition. Both are possible, but not demonstrated, secondary burials. Although these remains could be not directly associated with the Fremont, they do suggest a mortuary practice congruent with a mobile life way in the Escalante drainage. As of this writing the dozen or so Wide Hollow Phase pithouses excavated have yielded virtually no evidence of on-site burials. In marked contrast, the Coombs site, a village of sedentary farmers, had numerous Anasazi style interments.

Dating

The Wide Hollow settlement model described above and elsewhere (McFadden 1996, 1998) relies on direct dating of corn cobs and small twigs from granaries (Figure 141) as well as cross-dating of ceramics from the pithouse sites. Until recently there were no direct dates from Wide Hollow Phase pithouses that were presumed to be associated. Since their initial identification, BYU (Jordan and Talbot 2002) has excavated three of the pithouses recorded on Big Flat (Figure 140). These dates (Tables 31, 32) correlate well with both the upland granaries (Figure 141) and the maize date sequence from the Escalante River (Figure 139). In addition, dated pithouse sites on private land also investigated by BYU include the Overlook site (42Ga1585), Barnson site (42Ga5168), Rattlesnake Point (42Ga43), and Arrowhead Hill (42Ga5169) all of which have pit structures dating to the Wide Hollow Phase (Joel Janetski, personal communication 2012). Particularly notable is the Fremont-Anasazi pithouse sequence demonstrated by Janetski at Arrowhead Hill (personal communication 2012).

Madsen’s (1977) estimate of A.D. 700 for the earliest production of Emery Grayware has been revised, at least in Glen Canyon, to approximately A.D. 500 (Geib 1996). The earliest date for gray ware pottery reported in this volume comes from the floor fill of the Structure 1 pithouse at Dos Casas, (Table 31), Cal 240-610. While this date was considered too early for the structure itself by the excavators, Geib’s age seems increasingly reasonable (see Table 34).

The Escalante River Inventory

Additional support for the near exclusive use of the upper Escalante drainage by the Fremont during the early Formative comes from a suite

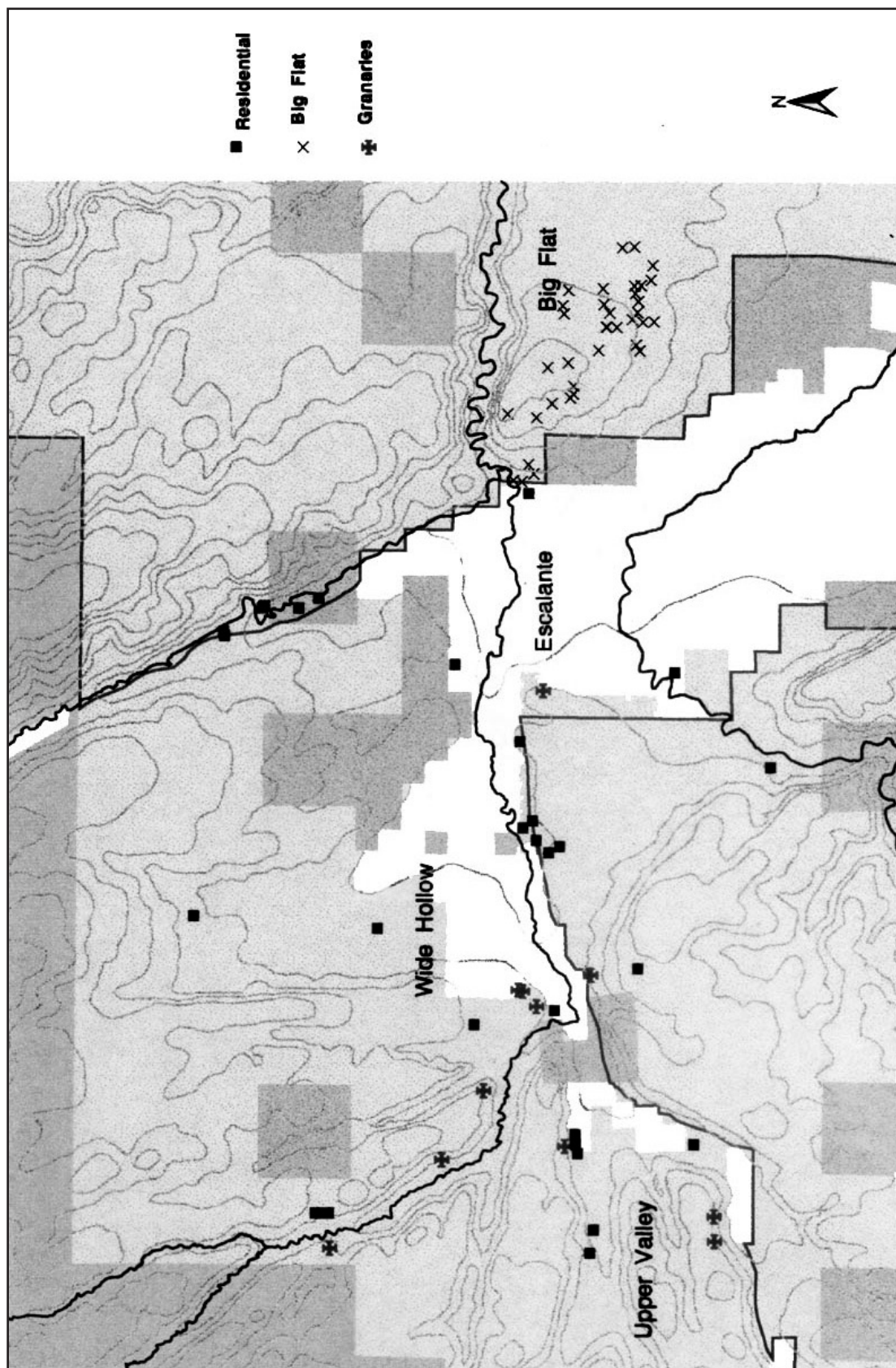


Figure 140. Residential and granary site distribution in the Escalante area.

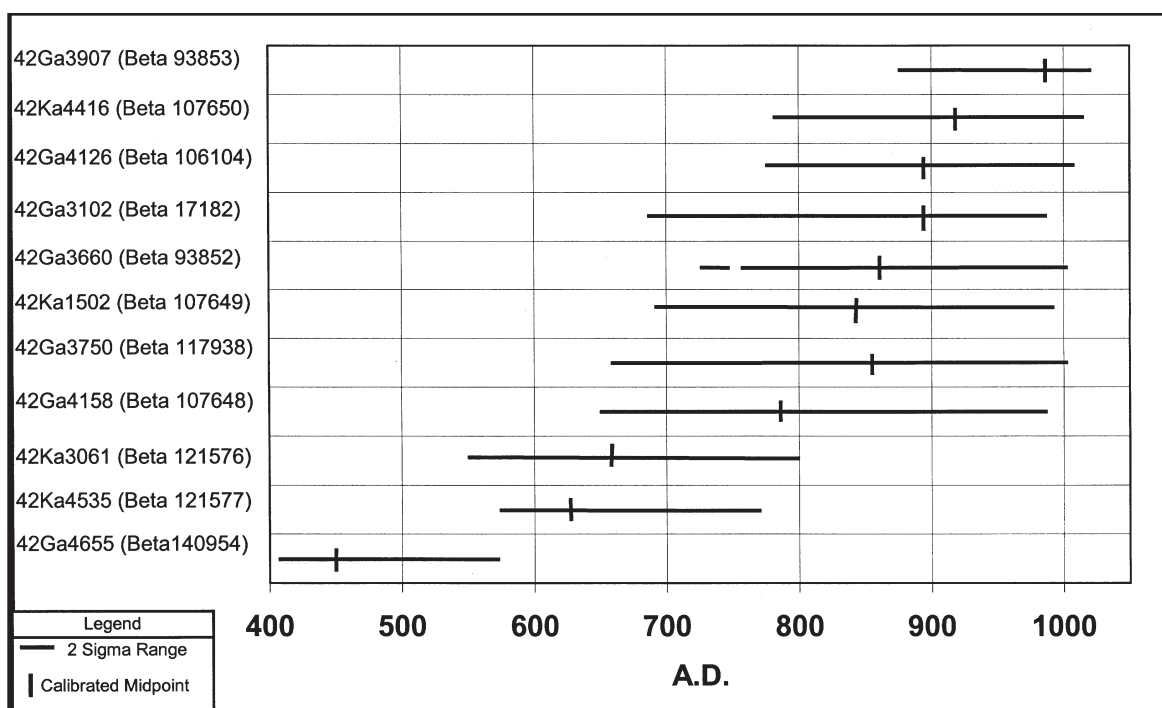


Figure 141. An array of early Formative radiocarbon dates.

Site #	Lab. #	C14 (B.P.)	2 Sigma Range	Cal. Curve
42KA4535	Beta 121577	1390+/-60	A.D. 575-770	A.D. 635
42KA3061	Beta 121576	1380+/-80	A.D. 550-800	A.D. 660
42KA1502	Beta 107649	950+/-60	A.D. 695-995	A.D. 880
42KA4416	Beta 107650	890+/-60	A.D. 780-1020	A.D. 905, 920, 950
42GA3907	Beta 93853	1090+/-50	A.D. 875-1025	A.D. 980
42GA4126	Beta 106104	1140+/-60	A.D. 775-1015	A.D. 895
42GA3102	Beta 17182	1200+/-60	A.D. 687-989	A.D. 895
42GA3660	Beta 93852	1160+/-60	A.D. 720-755 760-1005	A.D. 885
42GA3750	Beta 117938	1200+/-80	A.D. 665-1005	A.D. 865
42GA4158	Beta 107648	980+/-80	A.D. 650-985	A.D. 785
42GA4655	Beta 140954	1580±40	A.D. 405-570	A.D. 445
42Ka7192	Beta 328998	1120+/-30	A.D. 880-990	A.D. 900, 920, 940

Table 35. Early Formative Fremont Radiocarbon Dates.

of radiocarbon dates on maize collected from sheltered sites (See Table 33; Figure 139). These sites were recorded by Keller (2000) as part of an intensive inventory of the Escalante River corridor between its confluence with Calf Creek and the Glen Canyon National Recreation Area. Keller found very little evidence for Anasazi occupation within the Escalante River canyon. The reach from Calf Creek north to Pine Creek was inventoried by BYU with similar results (Harris 2005). Keller's sample consisted of corn cobs collected from both aceramic and sites displaying Emery Gray. In addition to rock art panels, most sites recorded were classified as camps and/or storage sites. The array of dates from Escalante Canyon is nearly identical to those reported by Geib based on curated cobs from the Alvey Site, Pantry Alcove, Triangle Cave, Sheep Horn Alcove, and Gates Roost sites (Geib 1996:87). Although the inventory sites were generally smaller than these alcoves, they too are located near arable bottom lands and functioned as both storage and temporary camps.

The terminal date for the Wide Hollow phase is a working definition; the available Fremont sites, with no evidence for late Anasazi contact, date to about A.D.1000 (Tables 33, 31). The presence of Pueblo II Anasazi ceramics at a few small inventoried sites, as well as those excavated during the Glen Canyon project (Gunnerson 1959; Fowler 1963), suggest that the phase may continue until sometime after A.D.1050. Late Pueblo II Kayenta ceramics were present in the fill of the otherwise typical Fremont sites of Rattlesnake Point (42Ga43) and the Spencer site (42GA51) (Gunnerson 1959). These and a handful of surveyed sites only suggest the possibility that the Wide Hollow Phase persists until, or possibly even after, the Anasazi "entrada."

The Kaiparowits Plateau

Radiocarbon dates from potential Fremont sites (see Table 37) on the lower, drier, elevations of the Kaiparowits Plateau north and west of Fiftymile Mountain are limited to two sheltered camps and a granary; 42Ka4535, 42Ka1502, and 42Ka3061. These dates occur during the Basketmaker III-Pueblo I period on the Grand Staircase and the Wide Hollow Phase; their cultural affiliation is ambiguous due to low quantities of ceramics, as well as artifact types that are common to both the Virgin and Fremont. Site types on the Kaiparowits

Plateau with evidence for maize agriculture include sheltered, north aspect camps and granaries located near riparian settings; no residential/pithouse sites are recorded. Although this pattern has much in common with the Fremont settlement pattern observed in the Escalante drainage (Keller 1999, Gunnerson 1959), assigning cultural affiliation based on the evidence at hand is problematic. Because much of the Kaiparowits Plateau receives insufficient precipitation for dryfarming, a focused inventory in the vicinity of seeps and springs may produce additional evidence for a logistically mobile farming strategy focused on riparian areas, as evidenced by granaries and seasonal occupied camps.

A Local Sequence from Steer Canyon, Fiftymile Mountain

Background

The Rainbow Bridge Monument Valley Expedition (RB-MVE) conducted a brief inventory of Fiftymile Mountain during the summer of 1937 under the direction of Ben Wetherill. The BLM reconnaissance inventory of Steer Canyon described here was carried out in September 2002 in order to relocate as many of the RB-MVE sites on Fiftymile Mountain as possible (McFadden 2004, 2011). Site notes and sketches of the RBMV Expedition were obtained from the University of California Los Angeles (UCLA) archives, courtesy of Selma Morley. The site cards provided cursory site descriptions as well as locational data for a few sites. Once located, identifications were not difficult (see Figure 147). Much of UCLA documentation is now on file at the GSENM. One of the main objectives of relocating the sites was to match them up with the ceramic collections thought to be curated at UCLA – this was never accomplished and remains a research opportunity.

Several of the expedition's sites were later recorded by the University of Utah during the 1957 field season on the plateau (Gunnerson 1959). Using Gunnerson's plane table map of the plateau, several were relocated and plotted on USGS 7.5 minute quads. Most of these sites held free-standing granaries and a sherd or two of quartz sand or basalt tempered grayware that suggested an early, probably Fremont, occupation. Also present at several sites were a few corrugated sherds that indicated a post A.D. 1050 Anasazi use.

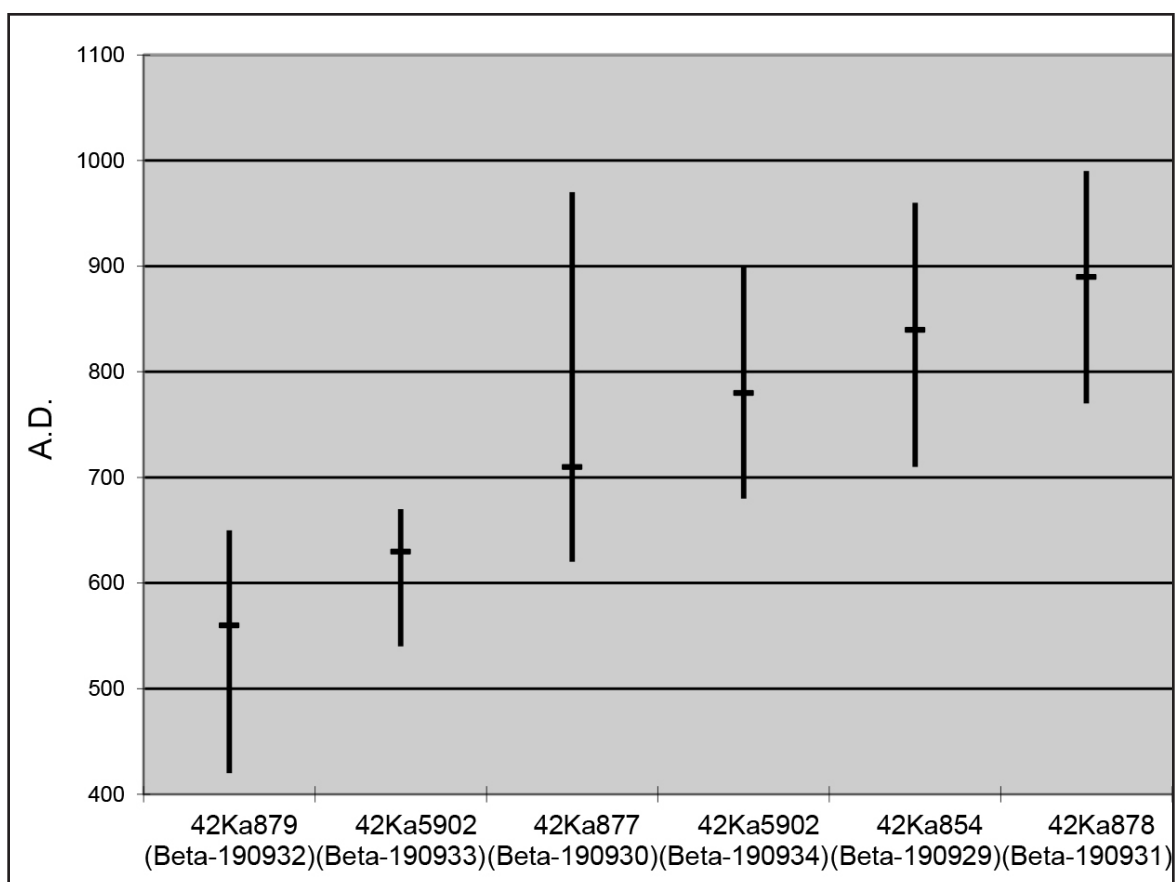


Figure 142. Steer Canyon radiocarbon date sequence.

Gunnerson recognized a Fremont presence on Fifymile Mountain and assumed it to be largely contemporary with the “most intensive (Anasazi) occupation” (Gunnerson 1959:360). An additional objective of the BLM reconnaissance was to collect radiocarbon samples to test the hypothesis that Fremont occupation not only predated the “primary” Anasazi occupation but to describe the subsistence practices and settlement pattern that existed just prior to Anasazi use of the plateau.

Organic material collected from seven sites, including four recorded by Gunnerson, yielded seven AMS dates providing a “local” sequence for the Steer Canyon drainage ranging from about A.D. 550 to A.D. 900 (Figure 142, Table 35). Although a few corrugated late PII sherds were noted, all of the actual dates fall within the Wide Hollow Phase. If the general Fremont-Anasazi sequence proposed for the plateau is correct, the pottery on these sites should be Emery Gray – it was not, at least not all of it. Although the sample size was extremely small, plain gray sand tempered sherds, also noted by Gunnerson at 42Ka854, 877, 878 and 879, were

collected at site 42Ka5902 as well. What types and quantities of pottery the RBMVE collected is unknown. Pottery is not abundant on these types of sites and for some the BLM reconnaissance was the third time they were formally recorded. Nevertheless, to some degree, it is not uncommon for a few plain gray sand tempered Anasazi sherds to occur on sites with predominately Emery Gray during Wide Hollow Phase (See Gunnerson 1959; Keller, 2000, 2001; Harris 2005).

Steer Canyon Site Descriptions

42Ka5900

This site consists of a single, relatively large, masonry room perched on the edge of Pinto Mare Canyon. It is constructed of sizable blocks of sandstone that are found on or near the site. Masonry appears not to have been dressed, but has been carefully selected. The structure measures 10m x5m and is oriented NE-SW although the slope just back from the rim makes the aspect northwest. Massive coursed masonry is found on the ends and

Site #	Lab. # (Beta)	C13/1 2	Material	Conventional Radiocarbon age	2 sigma cal. range (95%)	Calibrated midpoint
42Ka854	190929	-25.8	wood	1200+/-40BP	AD 710-910 AD 920-960	AD 810, 840, 860
42Ka877	190930	-8.6	maize	1280+/-90BP	AD 620-970	710
42Ka878	190931	-9.0	maize	1160+/-50BP	AD 770-990	890
42Ka879	190932	-9.1	maize	1510+/-60BP	AD 420-650	560
42Ka5902	190933	-9.2	maize	1440+/-50BP	AD 520-670	630
42Ka5902	190934	-9.3	maize	1230+/-50BP	AD 680-900	870

Table 36. Radiocarbon dates from Steer Canyon, Fiftymile Mountain.

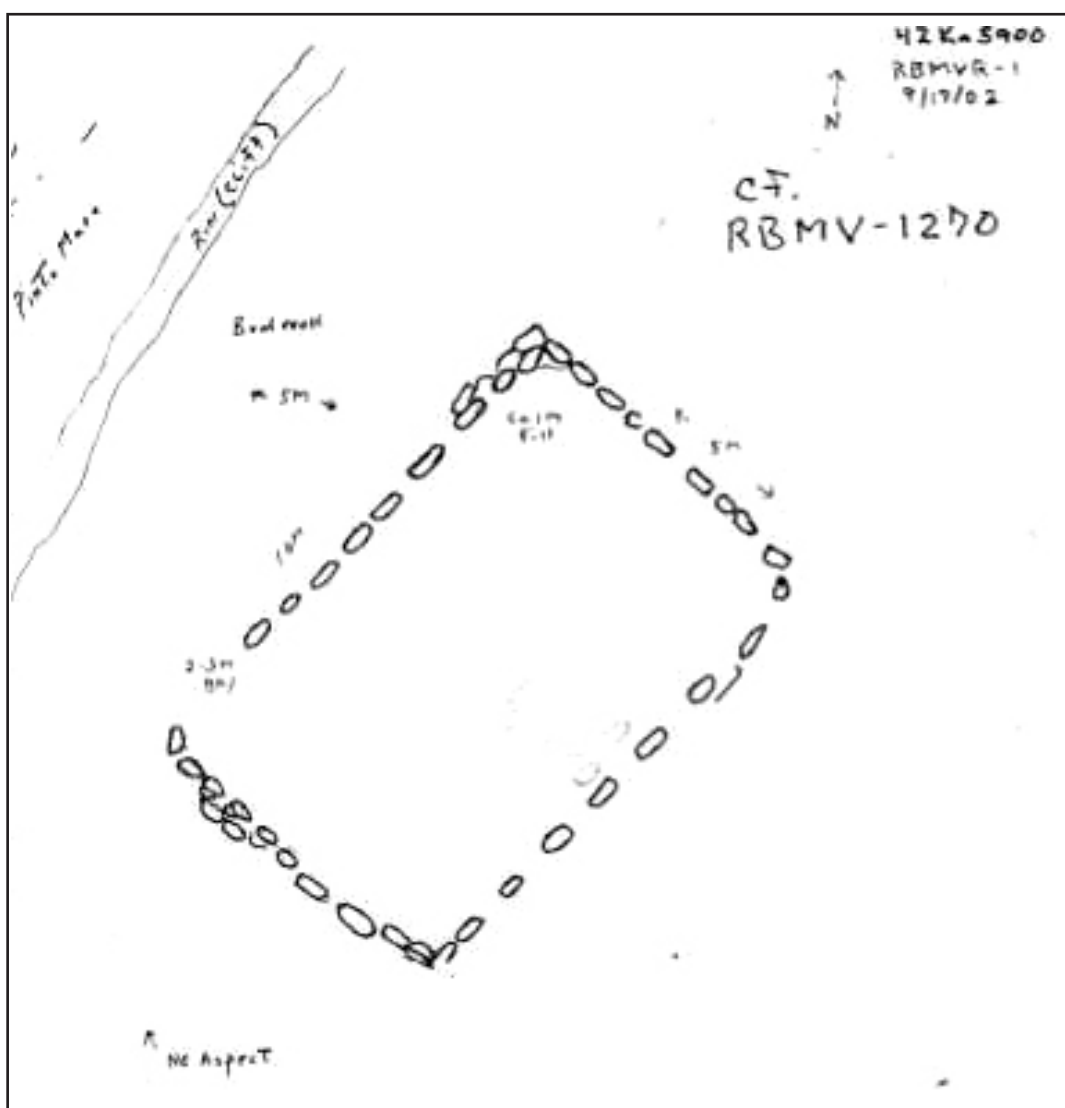


Figure 143. 42Ka5900 site plan.

also the southeast side. A gap/possible entry occurs on the northwest corner (Figure 143).

Rainbow Bridge-Monument Valley expedition member Bulger (first name unknown) described site #1270 as “on surface at rim of east wall of 1st canyon to west of Pleasant Grove. No pottery. Peripheral walls fairly complete, stones standing 3 and 4 high in places. Probably was 2 or 3 rooms but no evidence of separate walls.”

The large size of this structure argues for some sort of residential use, although no artifacts were observed. North aspect suggests summer use as a camp. Lack of obvious storage rooms suggests that storage in cists and granaries in rockshelters may have been the preferred method of securing foodstuffs.

42Ka5901

An impressive, well-defined panel of anthropomorphic figures cf. San Juan Basketmaker style but perhaps with Fremont influence as well. They are all highly stylized and are composed in groups of three or four. Also present are two “sheep” and an unidentifiable figure or two (Figure 144).

The panel is situated on a vertical east facing cliff face above the narrow, rugged floor of Steer Canyon. Access to the panel is pretty much restricted to the canyon bottom. Sally Cole calls them “figurine style” and suggests they date to the post A.D. 900

Fremont-Pueblo interface (Sally Cole written communication October 2002). The panel may be associated with a nearby camp, (42Ka5902), and burial (42Ka5903).

42Ka5902

The primary features on this camp are two (possibly three) “D” shaped areas formed by alignments of rock abutting the back of a large, deep, overhang which is located beneath a pour-over at the base of Steer Canyon. The best defined “structure” (#3) measures 5 meters wide by 3 or 4 meters back to front. The rock alignments are crude and about three courses high. Fill appears to be about 50 cm deep. A well-defined gap in the alignment just off center and oriented to the southeast appears to be the entryway. One sand tempered sherd was collected from the interior of the structure. Two additional sand tempered sherds (cf. Lino/Mesquite gray) were collected on the sites surface.

Adjoining structure 3 on the west is a clear area bordered by 3 or 4 rocks on each side and a couple of small boulders with milling slicks to the south. It is roughly 3 meters in diameter. On the east side of structure 3, separated by another clear space, is an area of dense ash, charcoal, and two (unidentified) plain gray sherds. This area is also about 5m in diameter. It appears to be disturbed, but not necessarily looted. Small roof spall fragments

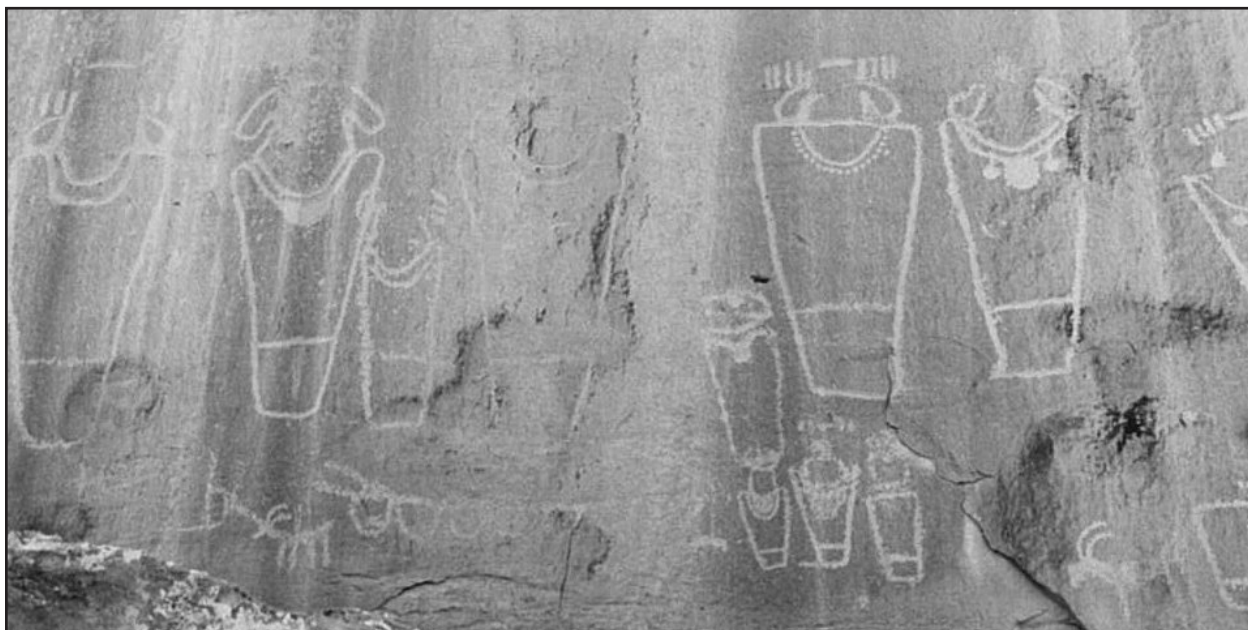


Figure 144. 42Ka5901 “figurine style” petroglyphs.

occur in the upper fill. A lump of clay, possibly daub, was noted suggesting architecture, but it describes better as simply a dense midden deposit. Although artifacts are rare, few slab ground stone fragments, burned rock, matted grass, and three corn cobs were noted. The corn cobs were collected for radiocarbon dating. A few minor petroglyphs occur on a large boulder to the east. A seep occurs on the extreme east end of the shelter.

The setting and architectural features on the site are consistent with an interpretation of it as a camp. Given its southerly orientation, and location at the base of the canyon, perhaps a winter camp suitable for accessing both the plateau above and the lower benches to the east. The “D” shaped living area is a common structure type on the plateau.

Two corn cobs recovered together from the midden-like fill on the east were dated. FS-1, a large, 155mm cob with 8 irregular rows yielded a 2 sigma date of Cal A.D. 540 to 670 (Beta-190933). FS-2, a smaller specimen measuring 80mm long, with 12 regular rows, dated A.D. 680 to 900 (Beta-190934). Taking each date at face value, the cobs suggest a relatively lengthy, if periodic, use of the alcove during the Wide Hollow Phase/BMIII-PI period.

42Ka5903

This site consists a human cranium and two long bones eroding out of a deep, recent, erosional cut in the talus and deep alluvium at the bottom of the canyon. No additional bone or any artifacts were observed. It is quite possible that the bone was displaced, but probably not far given the fairly good condition of the skull. Sutures were closed indicating the remains were those of an adult. The

long bones were oriented vertically and were 50 cm or so away from the skull.

Burials are remarkably rare on Fiftymile Mountain. A single “Basketmaker” burial, possibly a secondary interment, was reported by the RBMVE as site #1203. None were recorded during the University of Utah’s excavations and none have been reported from inventory work or casual observation since.

42Ka854

This site was recorded as part of the University of Utah inventory as: “Rockshelter, architectural. On west side near tip of ridge dividing East –West Steer canyons. Niche, 50 ft. below rim, walled forming room 8 ft. long, 3 ft. high. Half wall remains. Construction, vertical poles plastered with adobe containing small pieces of rock. Shelf in cist formed by supporting ends of 2 sticks against sloping rock wall, embedding other ends into adobe wall (Gunnerson 1959).” One North Creek Gray sherd was noted. Gunnerson noted that the structure was “a little larger than is typical ” (Gunnerson 1959:460).

Revisited in September 2002 the site location was plotted on the Blackburn Canyon Quadrangle and photographed (Figure 145). Field notes suggest that the jacal structure appears to have been remodeled with masonry. The 2 sigma calibrated results of a twig fragment from a matrix of loose adobe was AMS dated Cal A.D. 710 to 910 (Beta-190929) and Cal A.D. 920 to 960 with intercepts at A.D. 810, 840 and 860. A single sand tempered, possible Black Mesa Black-on-White style sherd was collected below the structure.

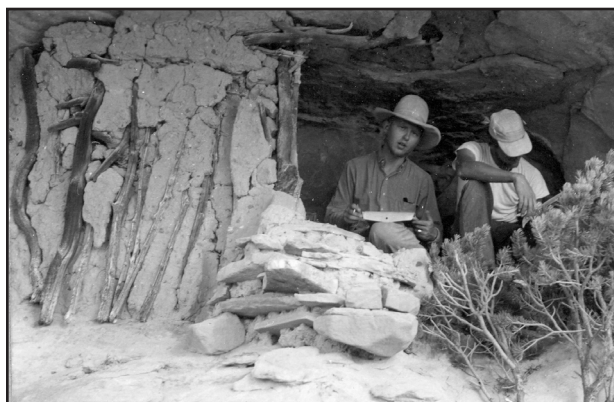


Figure 145. 42Ka854. (left) C.M. Aikens recording (Gunnerson photo provided by Duncan Metcalf, University of Utah files); (right) 2002 photo.

42Ka855

This site was recorded as part of the University of Utah inventory as: "Rock shelter, architectural. On west side of ridge dividing East-West Steer canyons. Niche, 8 ft. above top of talus, walled up forming cist 8 ft. long, 3 ft. deep, 3 ft. high. Door opening, nearly circular, 2 ft. across, on one side of center of wall. Wall construction, adobe plastered on few vertical and horizontal sticks. Vertical stone slab included in wall. Stick lintel doorway. Walls 4-5 in. thick." (Gunnerson 1959). No artifacts were observed or collected.

Revisited Sept. 2002, the site was plotted on the Blackburn Canyon Quadrangle, photographed and compared with Gunnerson (1959:460). No deterioration noted. Three plain gray basalt tempered sherds cf. Emery gray were collected.

42Ka856

This site was initially recorded as RBMV-1271 and subsequently recorded by Gunnerson and described as: "Rock Shelter, architectural. On west side of ridge dividing East-West Steer canyons. At top of talus slope 20 ft. below rim, in bay with shallow rock shelter showing signs of occupation. To rear of shelter, small niche was walled up, small section of stone slab and adobe wall now standing. Enclosed room probably 5 by 6 ft. Area of bay: 30 by 30ft. Pottery: North Creek Gray, 2. (Gunnerson 1959).

As described by RBMV crewmember "Bolger"; "Cave 3rd canyon on w. from Pleasant Grove camp – east side. Little pottery & flint interior walls 2 ft high extending from south side of cave to middle – shallow caves to north may or may not have been used."

This site was visited and photographed in May 1977 (Figure 147) and again in September, 2002. Some deterioration was noted. See sketch of relative locations for 42Ka854, 855, and 856.

42Ka872

This site was recorded by the University of Utah inventory as: "Rock shelter, architectural. Head of East Steer Canyon, midway between rim, canyon floor (Figure 148). Shelter above heavy stand of pinyon, sage. In canyon below, spring, aspen grove. Alcove in shelter walled up forming room 12 ft. dia. Extending from front of room, 2 parallel walls 4 ft. long. 4 ft. away, fallen wall blocks of room 12 ft. sq. also built against back of shelter. Construction crude, large blocks, slabs, little adobe." "Area: 25 by 100 ft. Rainbow – Bridge Monument Valley Site No. 1264."

"Pottery: Moenkopi Corrugated, 6. Perishable materials: Corn cobs, 5; coiled basketry, 1; cucurbit fragment, 1." (Gunnerson 1959).

This site was visited in 2001 photographed and plotted on the Blackburn Quadrangle map. No evidence that it was RBMV-1264 was noted. Condition appears stable. No collection was made.



Figure 146. 42Ka855, Fremont granary.

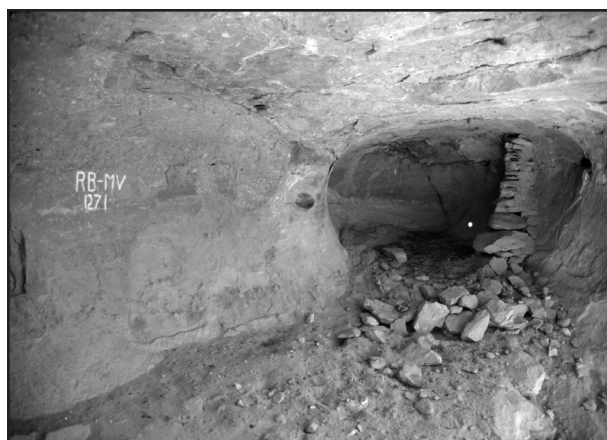


Figure 147. 42Ka856, Rainbow Bridge -Monument Valley site 1271.



Figure 148. 42Ka872, May 2015 photo; detail (left); overview (right).

42Ka874

Recorded by the University of Utah (Gunnerson 1959) and described as: “rock shelter, architectural. On east side of ridge dividing east branch from Steer Canyon. Ridge cover pinyon, juniper, sage. Canyon contains pinyon and juniper. One end of shelter, niche walled up with stone and adobe forming storage room 6 feet long, 4 feet deep, 3 feet high. Door opening 1 ½ feet wide, 2 feet high stone slab threshold just off center. Wall 8 in. thick, equal parts adobe, stone. Area of shelter 15 by 80 feet. No material collected or observed.”

Revisited Sept. 2002, the site was plotted on Blackburn Canyon quadrangle. and GPS'ed. Photographs were compared with Gunnerson's (1959:459) photo. Nip collected from the only corrugated sherd on site cf. North Creek Corrugated. Late PII style masonry architecture. Appears to be a typical, late PII granary.

42Ka 875

Recorded by Gunnerson (1959b) as “Rock shelter. On east edge of ridge separating east branch from West Steer Canyon. Shelter 30 by 30 ft. Rainbow Bridge-Monument Valley Survey No. 1273. No artifacts observed or collected.” Gunnerson gives no reason for recording a site with no artifacts or features.

RBMV expedition Bulger describes the site: “Triplex Cave. Master bedroom, living, childrens quarters and kitchen plainly discernible. Retaining wall between kitchen and children's bedroom. Pottery: black on white, red, gray. Believed ancient Indians used side cave to creep in, crap and creep out again. 3rd canyon w. s. from PL.G.C. – opposite site 1271.”

Relocated Sept. 2002 as #6: Just 50 m+/- to west (of 42Ka874) are a couple of small, mini alcoves that Gunnerson may have recorded. One “double” has a sort of partition wall and a cleared, but cattle trampled 4-5m area. Milling slab below. The large alcove has RBMV 1273 neatly painted in 10 cm high white letters. A boulder with milling slicks has been stood on end at the back of the shelter. This is a deep 2 leveled alcove, obvious from the opposite side but no architecture, deposits, or artifacts other than the boulder slicks/grooves, and a Kaibab? chert flake. Considering the proximity of the granary (42Ka874) and the “camp”, they may be associated.

42Ka 877

Recorded by University of Utah (Gunnerson 1959) and described as: “Rock shelter, architectural. On west side of head of West Steer Canyon. Mouth of shelter is choked by scrub oak. Moss in shelter. Storage cist 4 ft. dia. 3 ft high built on large rock. Construction of unshaped sandstone blocks, adobe mortar. Walls 8 in. thick. Near cist, stone slab with 11 grooves 2 in. wide 1 to 1 1/2 in. deep, 2 narrow grooves. Probable axe, awl sharpeners. Triangle 12 in. on side pecked in fallen slab. Spaced on sides, 10 pits, each 2 in. dia. Red handprints, 22 “tally marks” red “snake” on wall, ceiling. Few scattered rocks suggest another structure. Good spring just below shelter. Area: 30 by 150 ft. Material observed or collected: Pottery, North Creek Gray, 2. Stone artifacts: Milling slab, 1. Perishable material: corn cobs, 2.”

Description. This site was revisited to upgrade the site form, monitor condition, and particularly to obtain organic material for radiocarbon dating.

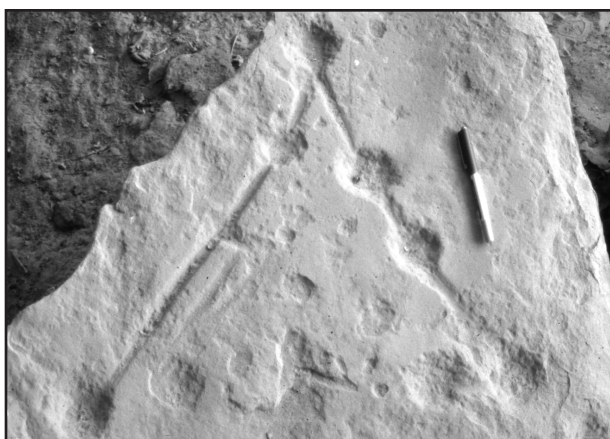


Figure 149. 42Ka877, triangular cupule and groove feature (left); storage cist (right).

The initial visit to the site was in May 1977. The attached photos indicate little change has occurred over the past 25 years.

I would now consider this to be a Fremont site based on the free standing granary. One sherd of Emery gray was noted. Above the granary are two hand prints in red ochre. Milling slabs (2) occur on the floor of the shelter and as noted by J.G., an impressive boulder with both horizontal and vertical milling/ sharpening grooves. The triangle and groove feature is in the same condition as it was in 1957 (Figure 149). Two good sized 18" long, partially burned logs are present that probably associate with the occupation.

A corn cob collected from the surface yielded a 2 sigma date of Cal A.D. 620 to 970 (Beta-190930) with an intercept date of A.D. 710.

42Ka878

Recorded by the University of Utah (Gunnerson 1959). Described as: "Rock shelter, architectural. On east side of Steer Canyon. Much fallen rock. Talus slope in front steep and rough. Extensive sage flats above, to east of shelter. Good spring, aspen grove in canyon below. Storage cist 2 ft. high, 3 ft. diameter built on sandstone slab. Construction, sandstone blocks laid in adobe. Cist probably higher originally. Area 40 by 150 ft. Material collected or observed. Pottery: North Creek Gray, 4. Tusayan Corrugated, 1. Unidentified, 1. Perishable material: Corn cobs, 8."

Photographed in 1977 (Figure 150). Revisited in Sept 2002. Sites 42Ka878 and 42Ka879 occur in the same alcove. See description, sketch map and photos are provided on the 42Ka879 form. One of two corn cobs collected in the vicinity of the 42Ka878 cist describes as: FS-1, 99mm.x 26, slightly tapered, 12 regular rows. The two sigma



Figure 150. 42Ka878 granary.

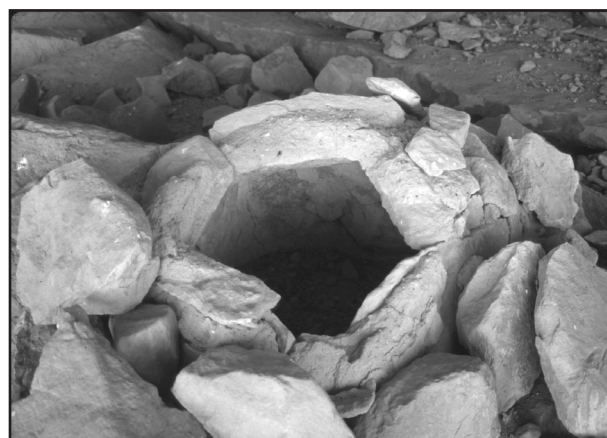


Figure 151. 42Ka879 granary.

calibrated result (Beta- 90931) was A.D. 770 to 990 with an intercept of Cal A.D. 890.

42Ka879

“Rock shelter, architectural. Site number applies to second cist in the rock shelter containing 42Ka878. Cist 1 ½ ft. deep, inside dia. 2 ft. at bottom, 1 ¾ ft at top (Figure 151.) Built against 2 boulders forming part of structure. Cist of vertical sandstone slabs set in adobe buttressed, on outside by stone chunks. Rim of horizontal slabs set in adobe. Construction 80 % stone.”

Material collected or observed. “Pottery: North Creek Black-on-Gray, 11; North Creek Gray, 8. Perishable material: Corn cobs 26; cucurbit fragments” (Gunnerson 1959).

Gunnerson recorded each of the two cists in the shelter as individual sites. The Sept 2002 reconnaissance sketch map suggests that the two sites are not really discrete. Midway between the two cists is a cleared area against the back wall about 4 meters in diameter. It is surrounded by small rock and boulders on the front. Adjoining it is another alignment that seems to form a second living/activity area. Corrugated sherds are associated with both 42Ka878 and 879.

A corn cob collected from the central area yielded a 2 sigma radiocarbon age of Cal 420 to 650 (Beta-190932) with an intercept date of A.D. 560. This is the earliest radiocarbon date on the plateau, as well as the earliest evidence of agriculture. It is also approximately 300 years earlier than the cob dated on nearby 42Ka878.

Taken as a single site with long-term occupation, sites 42Ka878 and 42Ka879, appear to represent a seasonally occupied camp with very limited storage capacity focused on agriculture. Maize, dating to as early as the mid A.D. 500's, and the presence of corrugated ceramics, not only demonstrates occupation of the shelter over a 500 year period, it offers the possibility that the mobile adaptive strategy proposed for the Fremont during the Wide Hollow Phase extended into the Fiftymile Mountain Phase.

The Steer Canyon Sequence

On the lower end of Steer Canyon the site cluster of a substantial camp (42Ka5902) associated with a spring, the figurine petroglyph

panel (42Ka5901), and an apparent bundle burial (42Ka5903) overlook Grand Bench Neck and other mid elevation benches. The lack of granaries or any storage capability associated with the cluster is notable. Multiple rooms and the two non-overlapping sequent dates (Figure 141) demonstrate at least episodic use during the Wide Hollow Phase. Given the proximity of these sites, actually features, to one another and their natural setting, the case may be made that they are contemporary, or at least associated in some way.

The location of the sites is well removed from arable soils but they do lie along a logical route between the top of the plateau and the intermediate elevation zone such as Grand Bench. According to early Glen Canyon Project surveys the predominate pottery type found there is Fremont (Suhm 1959). More recent inventory suggests that camps, often with groundstone, may suggest exploitation of cool season grasses such as Indian Rice Grass (*Oryzopsis hymenoides*) and perhaps cheno-ams and spring forbs. Grand Bench, at about the same elevation as the Escalante Desert, has similar sites with abundant ground stone and may also have been part of an early spring foraging zone. While immediately available resources are not apparent in the canyon bottom the setting offers reasonable protection from the elements and access to both the plateau above and the benches below.

On the upper end of the canyon, the alcoves recorded by Gunnerson (42Ka877, 878, and 879) are located just under the rim of the plateau and appear to be camps with limited storage. Dates from these sites span the Wide Hollow Phase/ BMIII and PI periods. In addition, they're sparse assemblages of plain gray ceramics, suggest they were in use at about the same time as the lower cluster (42Ka5901, 5902, 5903). Their designation as temporary camps seems appropriate. Wide Hollow Phase pithouses, presumably winter residences, were not encountered in Steer Canyon but are known to occur on the plateau above as well as Fiftymile Bench which is nearly 1,000 feet below the rim. A directed effort to locate pithouses in different settings around Steer Canyon might flesh-in sites that represent a complete annual cycle.

The sand tempered plain gray pottery encountered on some of the sites, appears to be Basket Maker III or Pueblo I and could have been produced in either the Virgin or Kayenta areas - although the latter seems increasingly probable.

Whether the sherds were acquired through trade or represent an actual Anasazi presence is problematic; the question is raised how intense was the apparent early Fremont-Anasazi interaction and how long did it last? A third possibility, mentioned earlier, is that sand tempered pottery was locally made.

A late Formative presence on the Steer Canyon sites is evidenced by the few corrugated and Black-on-White sherds noted by Gunnerson on otherwise early sites (42Ka854, 872, 874, 875, 878 and 879). Possibly the large room (42Ka5900) on the rim is late Anasazi as well, however, large rectangular masonry alignments are known in Fremont contexts (see Figure 136). At any rate, based on its north aspect and lack of artifacts it seems likely its use was limited to summer activities.

Taken as part of a related system, the Steer Canyon sites suggest a relatively mobile, agricultural/foraging pattern during the Wide Hollow Phase that may have continued into the late Formative Period.

Wide Hollow Phase Sequences

Three temporal sequences, from separate and discrete areas, define the Wide Hollow Phase; the Fiftymile Mountain/ Steer Canyon sequence (Figure 142), the Escalante River sequence (Figure 139), and those from the Escalante Valley/Wide Hollow area (Figure 141). All three areas have similar site types including: 1) numerous granaries which are generally small, constructed of jacal or masonry usually built in accessible locations 2) sheltered or open camps often located near the granaries and 3) pithouses, which appear to represent winter residences. Rock art often associates closely with the sheltered sites.

Pithouse distribution patterns vary widely: they occur as individual structures or in clusters often in favored agricultural settings with live water such as Wide Hollow, the damp alluvium of the lower Escalante canyon system, and near high elevation seeps and springs such as those on Fiftymile Mountain. While pithouse residences are often associated with these agricultural settings, they also occur in locations more favorable for winter use such as Big Flat (Figure 140) The Big Flat distribution pattern has been proposed as an upland zone with southerly aspect, abundant firewood and access to deer winter range (McFadden 1996). The alluvium

of Escalante Canyon below, while favorable for agriculture, would have been an uncomfortable choice for winter residence.

What these site types and their distribution patterns describe is a settlement-system adapted to a wide range of environments spanning the period A.D. 500 - 1050. As regards subsistence, while each of the three "local" sequences has an agricultural component, all appear to also have a relatively high reliance on native flora and fauna as well. Unlike Virgin storage units on the Grand Staircase, Fremont granaries are generally quite small. Storage architecture, of any size, has not been identified on residential sites at all. Unlike the Anasazi, Fremont subsistence does not seem to have relied on storing large surpluses of maize. While all three localities may have been essentially self-sufficient, the degree of mobility between them including foraging options as well as social interaction, remains an open question.

Madsen and Simms' (1998) characterization of the "farmer-forager and forager-farmer" options seems to be congruent with the Escalante settlement and subsistence patterns during this period. Clearly it stands in marked contrast to the pattern described for the Grand Staircase Virgin populations described earlier in this volume.

Late Formative Period (A.D. 1050/1100 to A.D. 1200)

The general category, Late Formative, is retained for the A.D.1050/1100-A.D.1200 period in the Fremont sequence even though the Fiftymile Mountain Phase suggested for the local Anasazi expression covers the same geographic area and appears to be sequential with the Wide Hollow phase. This is because the Wide Hollow Phase (A.D.500 - 1050/1100) represents an indigenous long-term adaptation of unknown duration; on the other hand, the Fiftymile Mountain Phase appears abruptly as an adaptation employing Anasazi ceramic, projectile point, and architectural types. At this juncture, it is not clear whether sites and strategies identifiable as Fremont continued into the 12th century in the Escalante drainage. The continuity, or lack of it, between the Wide-Hollow and Fiftymile Phases remains to be demonstrated.

Three scenarios seem reasonable: 1) Fremont material culture was replaced by Anasazi material

culture through a process of enculturation. 2) Fremont populations were replaced by Anasazi immigrants or, were simply succeeded by the Anasazi after a short hiatus or, 3) Fremont and Kayenta populations co-existed in the Kaiparowits-Escalante region.

In the first case, the Wide Hollow and Fiftymile Mountain Phases are considered sequential; the Fremont and Kayenta populations merged or “blended” (Jennings 1966) and Fremont material culture was replaced by Anasazi ceramics, projectile point styles, and masonry techniques. At the same time, however, traditional Anasazi subsistence and settlement patterns seem to have been strongly influenced by the existing, well-adapted Fremont strategy. This is particularly evident on Fiftymile Mountain where numerous isolated granaries hint at a more mobile, Fremont-like, adaptation. In this regard, the flexible nature of Fremont subsistence behavior (i.e. individuals) proposed by Madsen and Simm’s (1998) might be viewed as support for this scenario. The answer might be related to settlement and population dynamics during the late A.D.1000’s and early A.D. 1100’s, whereby a small, mobile, Fremont population was overwhelmed by a larger population of Anasazi intensive farmers. If this was the case, outlier Fremont groups could have co-existed with the Anasazi with only intermittent contact between the two populations. A few of the Fremont sites with late dates, and largely discrete settlement/subsistence behaviors, seem to support this model.

The second scenario, involving population displacement, seems less likely. As Geib has pointed out, it is hard to imagine how the entrenched (i.e. well-adapted) Fremont could be displaced by Anasazi newcomers (Geib 1996). However, while the existing ladder of radiocarbon dates illustrate a smooth sequence from early to late, it is possible that a Fremont hiatus occurred in at least some portions of the Fremont territory during the critical period A.D.1000-1050.

In the third case, it seems likely that, were the Fremont and Anasazi to co-exist in the same area, we would eventually find evidence of some form of interaction. To date, there is little artifactual evidence of co-occupation other than the presence of a few Fremont sherds on Anasazi sites or small amounts of Anasazi pottery on otherwise Fremont sites. This co-occurrence of pottery, particularly common on Fiftymile Mountain and in the Escalante Desert,

is not easily explained. Reconstructable Fremont vessels have also been found in floor contexts with Anasazi vessels at the Coombs site (and also during late PII times at the Glass Eye site on the Grand Staircase (see Figure 91). Rather than local production of Emery Gray pottery it seems more likely that the small number of Fremont sherds and vessels found at Coombs and other Anasazi sites may simply represent non-local Fremont intrusives from beyond the Escalante drainage (Lister 1960). This hypothesis could be tested through petrographic analysis of the basalt temper in the vessels and its comparison with local temper sources that have been identified by Geib and Lyneis (1996).

Taken as a whole, the evidence on hand seems to support the concept of a Fremont - Kayenta “blend”, as suggested by Jennings (1966). Although the Fremont Wide Hollow Phase is terminated by A.D.1050 and radiocarbon dates for the Anasazi phase begin almost immediately forming a continuous sequence, the so-called “blend” that occurs during the Fiftymile Phase is not simply one of shared culture traits. While material culture items there tend to be stylistically and technically Anasazi, settlement patterns and the underlying adaptive strategy might be viewed as inspired by the Fremont. The essential problem here may be methodological; traditional culture-historical approaches are not very adept at defining and dealing with the processes that affected the Fremont-Anasazi relationship.

Pending resolution of the Fremont-Anasazi temporal relationship, the Late Formative Period is retained here as a sort of parallel, residual category for sites with “Fremont” manifestations that may persist beyond A.D. 1050/1100 in the Escalante area.

Discussion

The Late Formative category is useful for problematic sites and contexts with minimal diagnostics like Horse Canyon Shelter and Steep Creek Quarry (Tipps 1991). Rattlesnake Point and the Spencer Site (Gunnerson 1959) are both cross-dated with ceramics found in questionable contexts. Even if they are essentially Fremont sites they could simply reflect initial contact with the Anasazi, rather than a persisting Fremont tradition that co-existed with the Anasazi. The Mafeetahot site (Jacklin 1988) in the Boulder Valley offers one

of the few Late Formative radiocarbon dates from a “Fremont” site in the study area.

The Alvey site, a deep, stratified rockshelter, offered the excellent potential to sort out the culture history of the Escalante area, and it still may. The site yielded abundant artifactual material – particularly perishable items that were stratified in three levels of deposit totaling over four meters deep. Unfortunately, some question as to the reliability of stratigraphic control over the deposits has arisen (Geib personal communication 2000). As a comment on the importance of proper curation and the usefulness of archival research, Geib’s (1996) recent chronology, based on radiocarbon dated corn cobs curated at the University of Utah, offered the first insight into the true antiquity of the Fremont in the Escalante drainage. Keller’s sequence, based on sheltered storage and camp sites, parallels and supports Geib’s closely.

The University of Utah research focus during the Glen Canyon era was largely on the excavation of significant sites; Jennings was explicit about not attempting to decipher settlement patterns (Jennings 1966). As a result, the context for interpreting the Alvey site was limited. That said, wide-ranging reconnaissance surveys were the basis for distributional studies, of ceramics, artifacts, and site types (Lister 1964; Suhm 1959). Today, intensive surveys focused on collecting distributional data, arguably the mainstay of the Bureau’s CRM program, can target selected areas and environmental zones and effectively address settlement patterning.

As an example, reconnaissance inventory near the Alvey site has since identified an isolated granary (42Ka4445) with a few Emery Gray Fremont sherds within a kilometer downstream and a Fremont style slab-lined pithouse located on the wash terrace with both Fremont and Anasazi artifacts (i.e. a Rose Spring projectile point, a preponderance of Emery gray in association with a few Sosi Black-on-White and corrugated sherds). The Alvey site, and others nearby, represent an excellent opportunity to test the true association of Fremont and Anasazi artifacts which Gunnerson (1959) assumed and Geib (1996) has recently called into question.

Since the above was written (2000) additional dates supporting late Fremont occupation and actual Anasazi interaction comes from the work of BYU reported here (Rich’s Shelter, Casa Pequena), and additional excavation at the Rattlesnake Point (42Ga43) site. As mentioned elsewhere, the BYU

excavations on private land at the Arrowhead Hill site (42Ga5169) in Wide Hollow are clearly the best controlled excavations undertaken to date. Still, none of the sites offer definitive evidence of actual contact. Possibly the best sequence of dates for demonstrating of continuity from Fremont to Anasazi is from Fiftymile Mountain.

“Social Identity”

At the heart of defining the (archeologically defined cultures) Fremont-Anasazi relationship is the concept of social identity (Geib 1996, Bernadini 2005) or as Clark (2001) prefers, “group” identity. Rock art has been considered to be a clear expression of social identity (Geib 1996, Bernadini 2005). As Geib has pointed out, rock art originating in the Kayenta (and the Virgin region for that matter) and the Fremont style (Schaafsma 1976) are considered stylistically distinctive (Geib 1996:109). Geib has suggested that the distribution of Fremont rock art indicates an ethnic boundary with the Anasazi along the Colorado River. While common styles have been identified for Fremont sites in both the Escalante Canyons and Fiftymile Mountain (Figure 152), Anasazi styles have not been identified in either of these areas.

For example, rock art panels at the Alvey Site (Figure 151a) are considered Fremont (Schaafsma 1976) although the Level III deposits are considered Anasazi. More recently Harris (2005) and Keller (2000) report abundant Fremont rock art but few, if any, Anasazi designs in Escalante Canyon. Nor, to the authors knowledge, has any Pueblo II Anasazi rock art been documented on Fiftymile Mountain although red pigmented Fremont style pictographs have been observed at 42Ka4881 in association with a residential structure and a small assemblage of Anasazi ceramics (Figure 151b).

Given the weight assigned to iconography as a means of determining “social identity”, the lack of an Anasazi rock art expression, especially on Fiftymile Mountain, is puzzling; it could be a result of sampling error or possibly, a comment on persistence of one facet of Fremont culture. While there is limited evidence for carryover of other aspects of culture, either architectural or artifactual, in terms of settlement behavior, a case can be made for significant similarities between the Fremont and Anasazi during the late Formative period. This perspective is addressed in the following section.

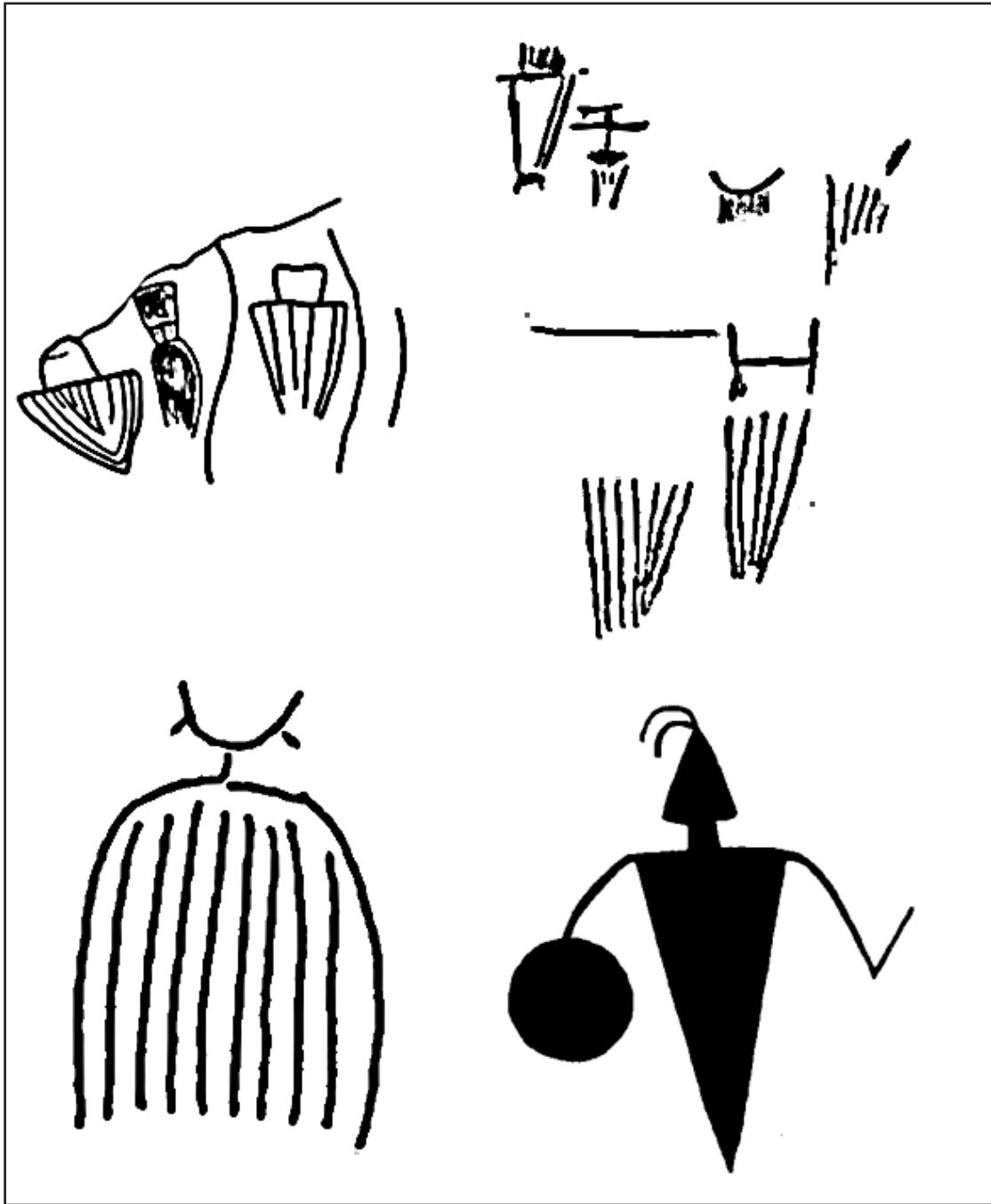


Figure 152. Examples of Formative Rock Art in the Kaiparowits-Escalante Region (no scale):
A) 42Ka172, the Alvey Site; B) 42Ka4881, Fiftymile Mountain; C) 42Ga966, Calf Creek; D) Red anthropomorph, Fiftymile Mountain (after Shaafsma); E) 42Ga966 Friendship Cove figures, 42Ga966 Calf Creek.

THE VIRGIN/ KAYENTA:KAIPAROWITS PLATEAU - ESCALANTE DRAINAGE

INTRODUCTION

The Anasazi manifestation in the eastern reaches of the Monument is largely restricted to the Late Pueblo II period and is generally described as Kayenta affiliated (Fowler and Aikens 1963; Lister 1964). The overriding diagnostic for these sites are Anasazi style ceramics generally associated with masonry granaries and a great variety of residential architecture. Sites with these characteristics on the Monument are virtually all located in upland environments (Figure 153). Their relationship with Anasazi sites in the lower Escalante drainage of GCNRA was a research concern of the Glen Canyon Project (Lister 1964) and it continues to be a topic of interest (Geib 1996, Keller 2000). On Fiftymile Mountain University of Utah crews conducted intensive inventories recording hundreds of small architectural sites (Gunnerson 1959; Fowler and Aikens 1964) while extensive “roving” surveys were being conducted in the adjacent Escalante Desert and Kaiparowits Plateau benches east of Fiftymile Mountain (Suhm 1959). In contrast, that survey recorded mostly camps and limited activity sites. The more recent BLM generated tree-ring and radiocarbon dates reported here are primarily from architectural sites on the Kaiparowits Plateau, with some caution they should be applicable to the surrounding areas as well.

Excavation data from Fiftymile Mountain (Fowler and Aikens 1964), the Coombs site (Lister et al. 1961), the Lampstand site (Baadsgaard and Fergusson 1999), the Circle Cliffs (Tipps 1991) and the more recent excavations conducted by Brigham Young University (Janetski et al. 2012), all of which provided significant data, are reviewed in this section. The University of Utah Glen Canyon Project investigations were conducted over fifty years ago. The research goals of that project were essentially culture historical (see Jennings 1966) in a region where the culture history was vague at best. No radiocarbon dating was conducted and only a single tree-ring date was eventually reported from Fiftymile Mountain. An important series of tree-ring dates from the Coombs site became available only after the report was written (Bannister et al. 1969). Site counts during the late 1950's and early 60's numbered below 1,000; documented sites for Kane and Garfield now number well over 7,000 for each county. By virtue of this increase in recorded sites alone, we are on much firmer ground as regards the distribution of both Fremont and Anasazi sites. As a result, combined with the radiocarbon and tree-ring dates presented in this section, several different models of Anasazi settlement and Fremont interaction can now be proposed.

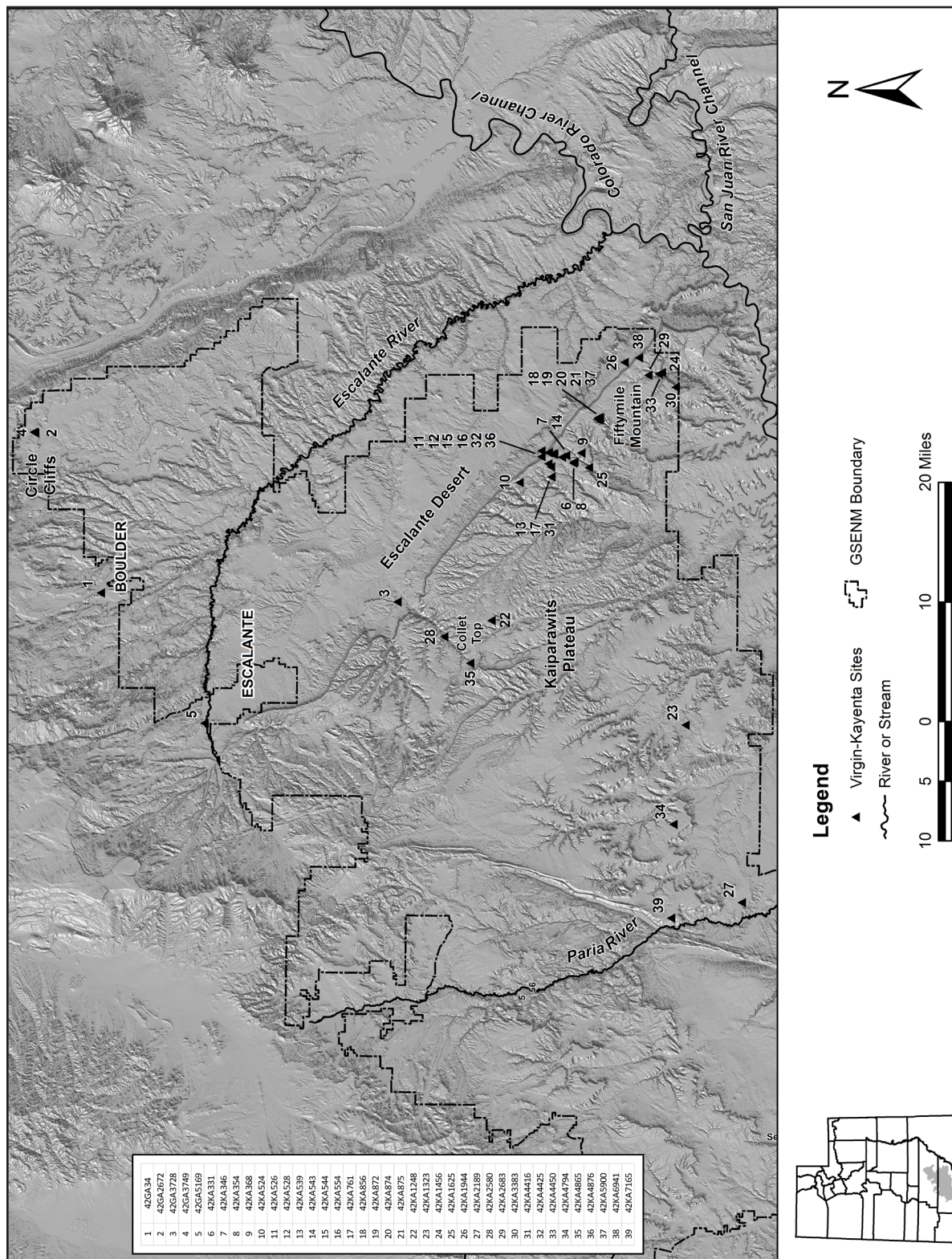


Figure 153. Selected Virgin-Kayenta sites on the Kaiparowits Plateau, Escalante River drainage, and Circle Cliffs localities.

Changing Perspectives on Anasazi “Immigrant” Origins

Probably the most serious drawback for early researchers focused on Anasazi population movement to the Kaiparowits Plateau and Escalante drainages was a lack of culture historical context from the eastern Virgin area. Notwithstanding the work of Judd (1926), Steward (1941), and Schroeder (1955), all of whom provided evidence for a Basketmaker-Pueblo sequence identified by ceramics and architectural traits, Florence Lister (1964:68,69) doubted the validity of a Virgin Branch - and therefore was suspicious of “Virgin” pottery types in general. She argued that the Anasazi occupation north of the Colorado River was a result of northward Kayenta expansion during Pueblo II times, hence the pottery, while “watered down”, was Kayentan (Lister 1964:68).

Based on his survey work on Fiftymile Mountain James Gunnerson proposed the immigrant Anasazi populations originated in the Virgin region to the west (Gunnerson 1959). It’s worth noting that he also considered them “Kayenta” in that they were part of the general Pueblo II expansion. Lister thought this geographical origin unlikely and asserted the movement was from “exactly the opposite way, from east to west” (Lister 1964:8). Following Lister, Fowler and Aikens (1963:8) opined: “The evidence of the ceramic complex shows the primary occupancy of the plateau to have been the result of a direct northward extension of Kayenta culture bearers from the Tsegi Canyon region of northern Arizona” (1964:8). So it went.

Geib, well experienced with Kayenta archaeology, has pointed out that neither the Kaiparowits ceramics nor the architecture appears to be Kayentan (Geib et al. 2001). This was the dilemma during the late 1970’s and 80’s for Virgin archaeologists as well; the architecture did not resemble the site types and layouts known in the Virgin region - therefore, Lister was probably right, the sites (and the pottery) must have been Kayentan!

In addition to identifying the origin of the Kaiparowits Anasazi, Lister had a second, very different population cluster to deal with as well, the Coombs site. Considering the Pueblo II sites in Glen Canyon as a staging point, she viewed the immigrants at Coombs as having “worked their

way up the Escalante River” (Lister 1964:78) and eventually up onto Fiftymile Mountain.

A recent sample survey of the Collet Top locality of the Kaiparowits Plateau, although some distance from Fiftymile per se, supports Gunnerson’s contention that the pottery originated to the west. Geib, Collette and Spurr (2001) identified mostly Virgin series pottery associated with a cluster of pueblos at Collet Top. A Virgin, or at least western origin for people and pottery, seems to be supported by recent surveys on the eastern Arizona Strip, Kaibab Plateau, and the eastern Grand Staircase. Ceramic assemblages there appear to correspond well with those identified by Lister from the Fiftymile Mountain survey and excavations (Aikens and Fowler 1963). Of particular note are similar frequencies for both Shinarump Red Ware (Virgin) and Tsegi Orange Ware (Kayentan) in the two areas. Although no architectural similarities have been noted between the two areas, the “L” shaped roomblock at the Coombs site is similar, if only in layout, to those in the Virgin area (see Figures 94, 98, 121). Whether the eastern Grand Staircase is considered Virgin - as is favored in this volume, or Virgin/Kayenta is a moot point; the accumulating evidence is that there was a strong relationship between Fiftymile Mountain and the Grand Staircase vicinity.

As regards that relationship, both Gunnerson and Lister recognized “some kind of local provincialism” on Fiftymile Mountain (Lister 1964:75). If, as now seems apparent, site types and layouts are not representative of either Virgin or Kayentan architecture, we are presented with a new pattern of settlement - one that can be viewed in a very different cultural context than was available to the earlier workers.

Early Perspectives on Fremont-Anasazi Interaction

Apart from the undated lower levels of the Alvey site, opportunities to define an early Fremont presence in the Escalante drainage were limited. In fact, Gunnerson believed that the Fremont originated in the Virgin area; he considered basalt tempered “Escalante Gray” (sic Emery Gray) to be a Tusayan Gray Ware type. Lister thought the Fremont were probably associated with the better known groups to the north but considered an insitu

origin possible (Lister 1964). While survey and excavation in the Escalante drainage produced a few sites with only Fremont pottery, a large number of camps were recorded with both Anasazi pottery and Fremont sherds. By using these sherd frequencies to identify Anasazi sites with Fremont contact, and Fremont sites with Anasazi contact, the distribution of each could be mapped (Figure 154).

Gunnerson thought the relationship between the Fremont and Anasazi “an interesting one” (Gunnerson 1959) but in Lister’s words he “saw no contact between the Kaiparowits population and the Fremont”: Lister, on the other hand saw the Kayenta and Fremont coming into “direct association” (Lister 1964:75). The nature of the contact was speculative: “not in open conflict” but “lack of potent influence on each other,” “mutual useage of hunting and chipping camps” and crossfinds of pottery that “imply intercourse”(1964:80). Elsewhere (1964:14) even possible “seasonal alteration” of site use but “little sign of cultural interplay “(1964:14). Based

on both pottery and architecture Fowler and Aikens (1963:10) saw “scant evidence of close Fremont-Kaiparowits relationships” but thought contact likely (Fowler and Aikens 1963:10).

Clearly, dating both the Fremont and Anasazi occupations was necessary to resolve the issue. Two absolute methods have been employed since the late 1970’s; radiocarbon dating which has demonstrated a lengthy Fremont occupation and tree-ring dating which has established a minimum span of occupation for the Anasazi. Because each dating method was suited to specific site types (tree-ring datable wood is rare on Fremont sites but radiocarbon datable maize is common), dating the full range of site types for each has not been achieved. Consequently, inferences about the temporal relationship between sites in their various settings are necessary. In so doing, the nature of the data directs our attention towards regional settlement issues which are viewed here as an appropriate approach for the Monument’s archaeological program.

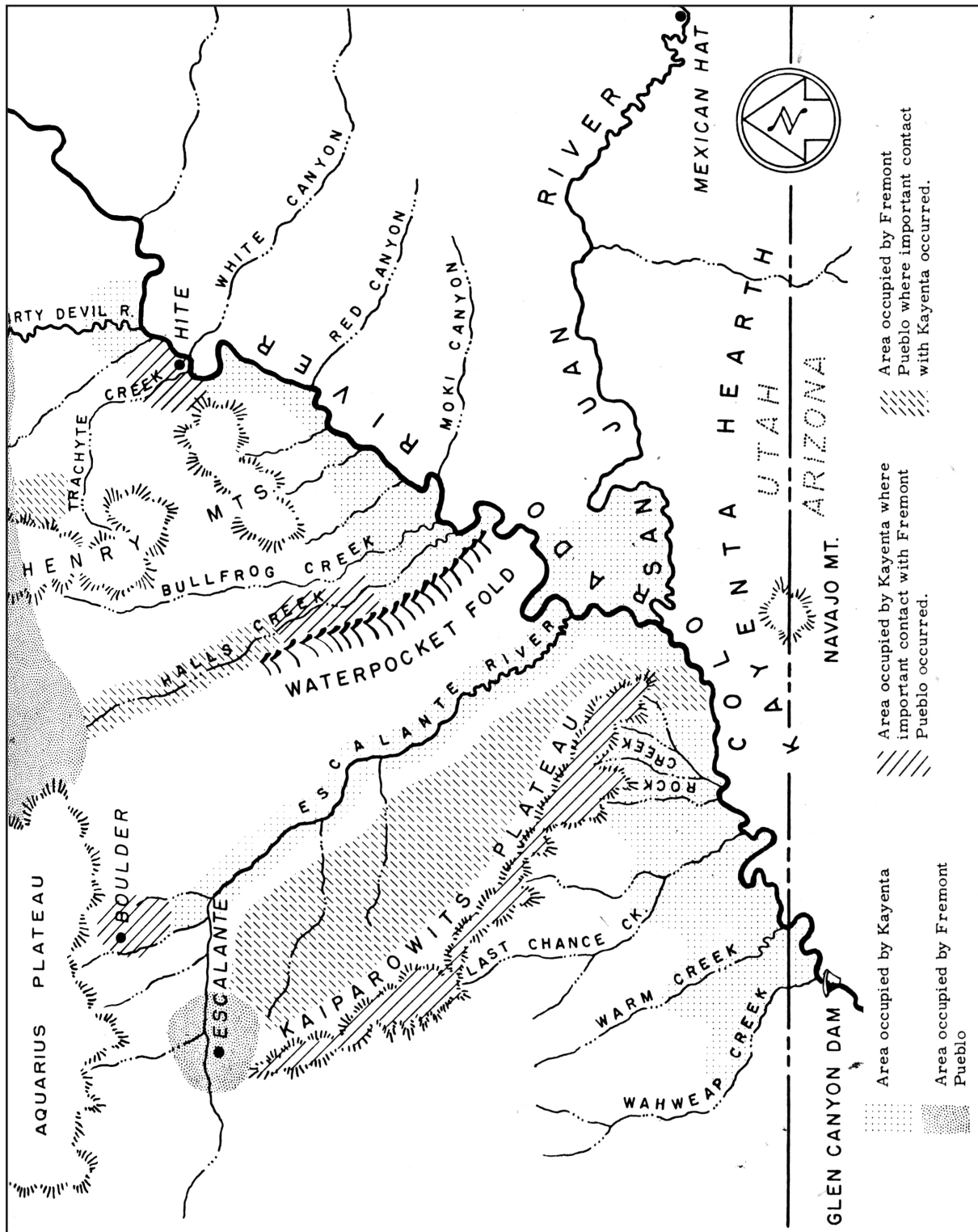


Figure 154. Distribution map showing the relationship of Kayenta and Fremont occupations (after Lister 1964).

PREVIOUS INVENTORY BY LOCALITY

The following sections describe several environmentally diverse localities and the site types present on them to illustrate Anasazi settlement patterns and ultimately allow the addressing of late Formative adaptive strategies. To the extent that Anasazi settlement coincides with earlier Fremont Wide Hollow Phase patterns is considered highly relevant to addressing the Fremont- Anasazi relationship. Whether they represent independently arrived at behaviors, or are a result of social interaction and cultural persistence remains to be seen. Many of these areas and sites display mixed ceramic and artifactual assemblages that may evidence interaction between the Fremont and Anasazi.

In Madsen's view, attempting to define one or another is futile because Formative culture in the area forms a socio-cultural continuum that can't be reasonably be defined as one or the other (Madsen 1982). Geib takes a less pessimistic view of the reality of these archaeological cultures proposing that the Fremont and Anasazi occupations are definable but were "mostly sequential." He makes the case that confusion over whether they were contemporary was largely a methodological problem resulting from mixing that resulted in "congeries" of pottery and artifacts with little temporal meaning. As was discussed in the last section, a Fremont presence (or absence) during the late Formative period is an issue that is still not resolved.

Nevertheless, what follows is an attempt to identify the range of Fremont and Anasazi site types, as they occur different environmental settings, with which to address Fremont and Anasazi settlement history and possible interaction. Ceramic assemblages on open camps, rock shelters, isolated granaries, as well as large and small residential sites all have different potential for demonstrating either truly associated ceramic assemblages or ambiguous "congeries."

Fiftymile Mountain

C. Melvin Aikens used the survey data from the initial 1958 inventory reported by Gunnerson (1959a) and his own subsequent inventory work

conducted in 1961 (Fowler and Aikens 1963), as the basis for his Master's thesis at the University of Chicago (Aikens 1962). The descriptive portion of the thesis appears to have been the basis for the excavation report (Fowler and Aikens 1963) but includes more detail. In his attempt to discern settlement patterns, Aikens tabulated and plotted a large number of non-randomly distributed sites in an attempt to define clusters of site types that "might suggest functional relationships or patterns of land use or perhaps give some indications of differing periods of occupation" (Aikens 1962:13). Aikens described the results as, "disappointing." He concluded that, the pattern of prehistoric settlement on the Kaiparowits plateau was simply one involving small dispersed hamlets of from one to four rooms scattered over areas of the plateau favorable for agriculture. While he did perceive small, scattered sites that today we might call field houses (Aikens 1962:15), he saw no set pattern of architectural style (Aikens 1962:57).

BLM inventories conducted since the Glen Canyon Project indicate that site types on the plateau are diverse. One type of site virtually ignored by the earlier investigations, that is potentially a very important one for interpretation of settlement patterns and adaptive strategy, is the isolated storage unit or granary. These substantial masonry structures range from individual granaries to multiple, variously sized, sometimes contiguous, storerooms. One of the more visible was recorded by Aikens (see 42Ka554) and recently radiocarbon dated by Matt Zweifel to the late 12th or early 13th centuries. Most granaries however are not visible from either above or below and have been documented since the 1970's from the air using helicopters. In contrast, are smaller granaries, often of jacal or composite construction, that are easily accessed. Based on an occasional sherd or two, they are proposed to be Fremont. Several of these structures have been dated to the Wide Hollow Phase.

Residential site types are another example of architectural diversity on Fiftymile Mountain documented since the early Glen Canyon Project inventories. An apparently common configuration

Residential sites in alcoves are another type not initially described that likely has implications for considering settlement patterns. These sites favor south aspect, occur in well-protected but easily accessed overhangs, and while defensible, most lack storage facilities and are at a distance from arable fields. Firehouse (42Ka1457) and Log House (42Ka4450), (see Figures 94, 95) are examples of this formal style that seems to be unique to Fiftymile Mountain. A third sheltered residential style is the circular to oval, subterranean, masonry structure - several of which are found overlooking Harveys Fear (42Ka3383, 42Ka2683) and another near Mudholes Point (42Ka1625). The substantial construction and south aspect setting of these structures also make them suitable for winter residence. The absence of obvious storage rooms on all, or most, of these sites may indicate that the abundant isolated granaries found under the rim of the mesa were associated.

Although a Fremont presence was recognized on Fiftymile Mountain (Gunnerson 1959; Fowler and Aikens 1963) their numbers were not appreciated, nor were site types described in any detail. The most common structure on these sites, which are identified by Emery Gray ceramics, is a circular, probably very shallow, "pithouse" outlined by boulders, upright slabs or simply circular stains. They occur individually and in clusters of up to three. They, like their counterparts with Anasazi ceramics, also seem to lack obvious long-term storage features.

Tank Hollow Burn Inventory (BLM files 2003)

Intensive block inventory of selected landscapes is the preferred method of assessing settlement patterns. An exceptional opportunity presented itself in the summer of 2000 when a wildfire burned

850 acres of sagebrush exposing 34 sites. Dense sage has always been a hindrance to survey so the fire provided an excellent opportunity to define structures and catalog associated stone artifacts and ceramics (Figure 156). Twenty-five structural sites were recorded including possible Fremont pithouses and features associated with the seeps and springs - possibly small garden plots, as well as masonry pueblos, circular structures, and field houses. These latter structures were distributed across the east-to-northeast aspect slope with deep soils that suggested extensive dry farming. Lack of identifiable storage structures was a common pattern on all sites suggesting a degree of mobility (Figure 157). The patterning of these sites in this arable setting and their consistent late PII ceramic assemblages appears to represent a contemporaneous cluster of farmsteads.

How these open architectural sites relate to one another and to sites both on and off the plateau remains a valid issue. If they were seasonally occupied we might expect related sites in other settings on the plateau (e.g. south aspect shelters), or even winter residences off the plateau at lower elevations to be part of a seasonally mobile pattern. Because their Late Pueblo II ceramic assemblage seems to mirror that on the Grand Staircase - and therefore extend in the mid 13th century, it is not known whether the Tank Hollow agricultural cluster was a response to the drought of the mid A.D. 1100's or are a consequence of the return to favorable conditions during the A.D.1200's. The possibility of a shift in settlement from an initial pattern that occurred during an extended period of drought, to a more traditional focus on dry-farming during the post-drought period, will require additional dating.

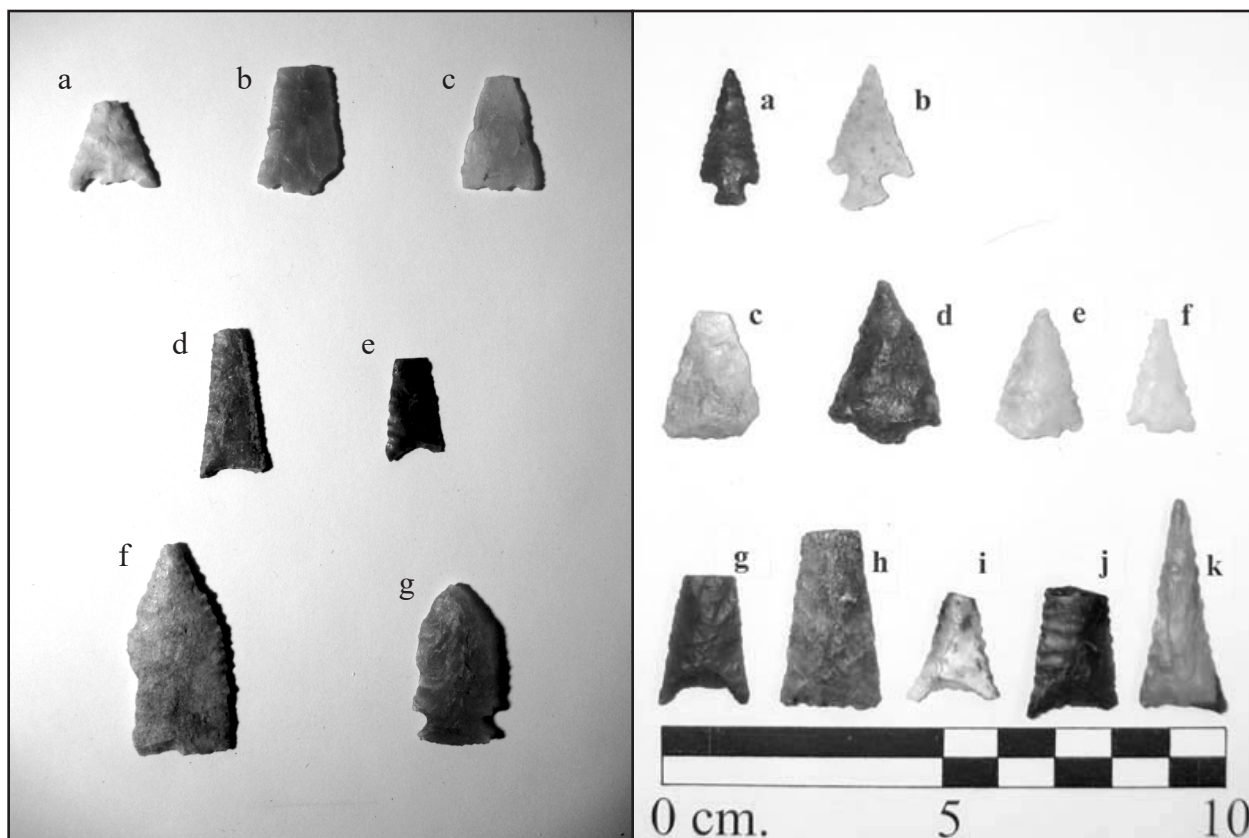


Figure 156. (Left) House Rock Valley examples: stemmed (a-c), Bull Creek (e, f), unidentified biface (g), corner notched. (Right) Tank Hollow, Fifty mile Mountain projectile points: Rose Spring (a,b), triangular (c) stemmed (d-f), Bull Creek (g-k).

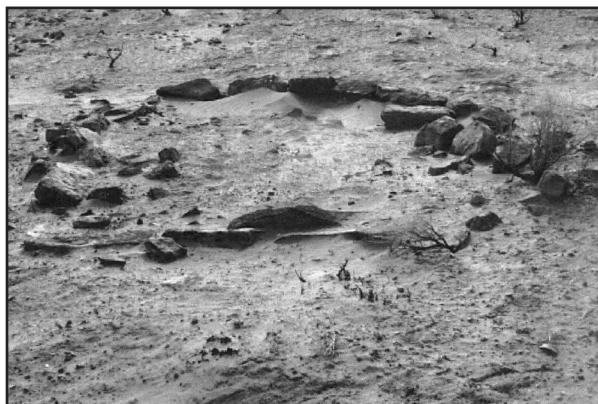


Figure 157. Tank Hollow Burn. 42Ka5598 (left), circular structure; 42Ka5601, rectangular masonry structure (right).

Collet Top

The original University of Utah survey ended at Basin Canyon because from that point north to Collet Top there are no springs and very little arable land. The Collet Top locality, some 10 miles to the northwest however, is an exception; there, deep soils, springs, and at elevations over 6,000 feet, adequate precipitation permitted agriculture. The setting allowed a moderate density of Anasazi residential sites associated with arable settings, as well as nearby granaries in the canyons (McFadden 1982, Geib et al. 2001). Unlike the concealed Anasazi granaries on the south end of Fiftymile Mountain, those at Collet Top are most often located in accessible alcoves and overhangs (Figure 158). Of possible significance, no Fremont sites are presently recorded in the area nor is Emery Gray pottery common on the Anasazi sites. Conceivably this indicates a lack of Anasazi-Fremont interaction in this locality that affected decisions on storage locations.

Window Sash Bench Chaining Inventory

This clearance inventory was conducted prior to the Section 110 inventories on the Grand Staircase that were instrumental in defining architectural layouts and ceramic associations. Field ceramic identifications and collections however do indicate a close relationship with the Grand Staircase during late Pueblo II times. Site layouts are not easily defined and seem to present a pattern different from the Grand Staircase and possibly Fiftymile Mountain - although it is entirely conceivable that there is a close relationship with both. The identification of Middleton Red Ware, now relabeled Shinarump Red Ware, as well as Tsegi Orange Ware is consistent

with Late PII assemblages on the eastern Arizona Strip, as well as the Grand Staircase.

North Fiftymile Mountain Reconnaissance.

While the Collet Top vicinity is easily accessible from the Escalante Desert by traveling up the Left Hand of Collet Canyon, the terrain between it and Basin Canyon to the south is extremely dissected, dry, and difficult to traverse. Even here, however, isolated granaries are known; the dry settings of these structures suggest that not all granaries were used to store agricultural produce.

The twin granaries at 42Ka4873 are good examples of well-constructed storage units in the Collet Top area (Figure 158). These adjoined structures display two separate architectural styles: 1) a curvilinear unit constructed of stacked slab masonry and an apparently later, linear granary constructed of coursed masonry that abuts it. Polychrome rock art elements painted on the back wall of the shelter were noted but the site could not be recorded in any detail because the ledge was not accessible without technical climbing gear. Both appear to be Anasazi although a more thorough documentation is necessary to demonstrate affiliation.

42Ka5923 (Figure 158) occurs in the same vicinity. Construction is similar to the initial granary at 42Ka4873, although the niche it is located in is a rather unique setting. Whether different construction techniques are a function of affiliation or period is not known. Two granaries in the Collet Top locality, 42Ka4865 and 42Ka1248, have been dated to Pueblo II/III times (Table 42). All of the granaries appear to be associated with the agriculturally oriented Anasazi occupation on Collet Top.

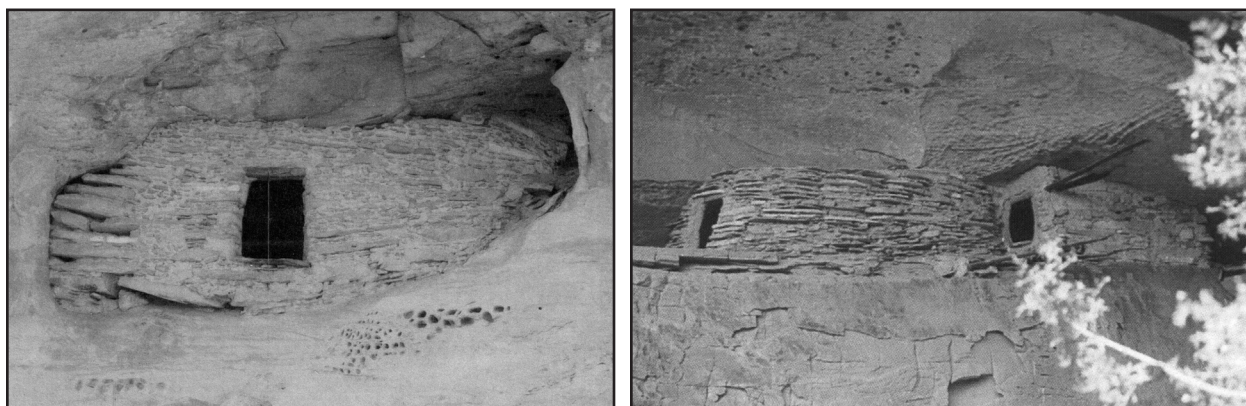


Figure 158. Collet Top granaries; 42Ka5923 (left); 42Ka4873 (right).

That said, in possible association with these isolated granaries are sheltered camps and lithic scatters which may have been used for limited hunting and gathering during the Formative Period. Recorded ceramic scatters in this locality are Anasazi; Fremont sherds have not been observed by the limited reconnaissance conducted to date. The most abundant commodities available on this portion of the Kaiparowits Plateau may have been pinyon nuts (*Pinus edulis*), mule deer, and big horn sheep. The sheltered camps in the area (e.g. 42Ka4875, 42Ka5906) often display one or more windbreaks made of logs and boulders bordering cleared living areas, but have minimal artifacts associated. If these temporary shelters are demonstrated to be late Pueblo II, they offer an opportunity to investigate a previously unrecognized foraging pattern of land-use.

Kaiparowits Plateau Sample Survey

This extensive survey was initially proposed in the late 1970's to provide baseline data for a grazing EIS. It was not carried out. After achieving status as a national Monument, a sample design similar to others on the Monument (Hauck 1977, Tipps 1988) was developed for each of the major benches on the Kaiparowits Plateau. Fiftymile Mountain was excluded from the sample because of the amount of existing inventory. In addition to the survey, testing opportunities were identified and carried out at thirteen sites (Geib, Collette and Spurr 2001).

While a few small, isolated Virgin Anasazi sites were found on the drier benches of the plateau, randomly selected quarter sections in the Collet Top vicinity identified several additional open structural sites with good excavation/research potential. Like earlier surveys, ceramics indicated that the occupation was post A.D. 1100. Several "school" sections with good site potential that were excluded from the sample are now part of the Monument and offer good research opportunities.

Findings of the survey compare well with previously made observations and those made since: Fremont pottery is rare and restricted to small camps and shelters thought to be Early Formative; Anasazi pottery is not associated with the Fremont camps; and, Fremont pottery is rare on Anasazi structural sites. Both ceramic cross-dating and radiocarbon dating place the occupation during late Pueblo II or possibly Pueblo III times. Future work

should consider whether the Fremont and Anasazi use was truly sequential as now appears to be the case.

Fiftymile Bench Locality

Fiftymile Bench extends along the base of the Straight Cliffs from Escalante south to Fiftymile Point. In general the bench is extremely rugged. The portion of interest here is south of Basin Canyon where it parallels the highest site density known on Fiftymile Mountain. At this point there are four historically used trails traversing the Straight Cliffs to the top of the plateau. The bench averages about 6,000 feet in elevation, a mid elevation zone between the plateau top (7,500 feet) and the desert (4500 feet). By most standards it appears to be an unlikely setting for agriculture. The alluvial outwash zone along the base of the cliffs appears to have permitted limited farming.

Both substantial Anasazi masonry structures (42Ka1944), Fremont pithouses, Anasazi style masonry granaries, small Anasazi farmsteads, and Wide Hollow Phase style granaries(42Ka7192) are known to occur on the bench. Overall, the pattern appears to be not unlike that on the top of the plateau.

In addition to arable soils, resources include springs at the base of the bench and pinyon and juniper firewood/construction source for both the bench and desert. Although knapable lithic material is rare in the area, a local unidentified "Bluestone" source of medium quality has been identified on the bench. Flakes of this local material, often quite large, are occasionally found on top of the plateau. Exposures of Cretaceous formations in the Straight Cliffs are potential clay sources for local pottery.

Escalante Desert

The Escalante Desert is a relatively level expanse lying between the base of Fiftymile Bench and the Escalante River. The "Desert" is an area of extensive grass and scrub lands divided into benches created by the major tributaries of the Escalante which include: Harris Wash, Twentymile Wash, Dry Fork Coyote Wash, and Fortymile Gulch. Elevation ranges from about 4,000 feet along the rim of the tributaries to the Escalante to 5,000 feet at the base of the bench. Having a modern annual

precipitation average under 10", dry farming was probably never an option for either the Anasazi or the Fremont. Springs, however, are plentiful, particularly on the south end of the Desert. Runoff in the larger tributaries offered limited farming opportunities; the best known agriculturally based camp is the Alvey Site in the Dry Fork of Coyote Wash. From a logistical perspective, the Desert's location between Fiftymile and the Escalante River and its intermediate elevation would have been an attractive foraging zone for occupants of either the canyons or the plateau.

The University of Utah's "roving" survey of the right bank of the Colorado recorded a relatively large number of sites in the Desert, as well as on the much less accessible benches west of Fiftymile Mountain (Suhm 1959). Reported from the Desert are numerous camps (n=44), characterized by ground stone, as well as chipping areas (n=28) (Suhm 1959:188). On Grand Bench, a grassland that lies at a similar elevation, the survey found a similar camps (n=7) and chipping areas (2).

Lister (1964: Table 4) lists dozens of camps in the Escalante Desert that display both Fremont and Anasazi ceramics. At least some of these sites are small, short-term occupations that could provide a less ambiguous context for sorting out Fremont - Anasazi relationships than the more obvious alcoves with deep but often disturbed deposits. Three of the Grand Bench camps yielded mostly Fremont pottery; two of which also had small amounts of Tsegi series corrugated (Table 4). The frequencies were reversed on the Escalante Desert: 501 sherds were Tusayan Gray Ware, 782 were Utah Desert Gray Ware. Only a handful of Coombs variety grays came from the Desert. Regarding red ware, none was reported from Grand Bench, the Escalante Desert sites had 32 sherds of Tsegi Orange Ware and 43 sherds of Little Colorado Series (sic Shinarump).

Research Opportunities

The emphasis on recording structural sites on Fiftymile Mountain and sheltered sites in the Escalante Canyons was justified by research goals and considerations of site sensitivity during Glen Canyon Project, and BLM management since. As a Monument research opportunity the Escalante Desert landscape appears to have played an important role in both Fremont and Anasazi settlement and subsistence. In addition to the early work reported

by Suhm (1959), the Escalante Desert inventory was augmented by a random sample inventory stratified by vegetation (Hauck 1979). An Escalante Desert landscape inventory was considered in the late 1990's. A review of the early sites including reassessment of curated collections and relocation of the sites was proposed as a starting point but not carried out. Based on previously recorded site settings, block inventory of selected tracts was considered the most productive approach. Other than ceramic cross-dating, chronology building opportunities on the Escalante Desert are rare. Only a single early Wide Hollow Phase radiocarbon date from a hearth (42Ka5153) eroding from a cut-bank has been documented.

Circle Cliffs

The Circle Cliffs locality lies approximately twelve miles northeast of the Boulder valley. Of interest here is that portion characterized as tableland underlain by the Chinle formation, bounded by a cliff-line of Shinarump conglomerate and Moenkopi Sandstone on the south and by a steep sheer-walled escarpment of Wingate Sandstone on the north. Average elevation of this tableland is about 6,500 feet making it an arable upland setting. In some regards, the physiographic character the locality it is not unlike that of the Grand Staircase.

The Burr Trail mitigation inventory and excavations (Tipps 1991), and the Tar Sands sample inventory (Tipps 1988) on the south, Kellers (2001) survey of the Gulch on the west, and the work of BYU at Capital Reef National Park on the east (Janetski 2005) indicate how limited the distribution of Anasazi sites is in the area. No structural sites were encountered by these surveys, although Deer Creek Shelter along the Burr Trail did yield Anasazi pottery thought to be associated with a Late Formative Fremont occupation (see 42Ga3128 description).

The Lampstand cluster are the best known Anasazi sites in the area and were investigated by BYU (Baadsgaard and Fergusson 1999). Subsequent survey in the Circle Cliffs by BYU (Baker 2000) seems to suggest a very limited, apparently brief, Anasazi occupation during Pueblo II times - in otherwise Fremont territory. Limited, short lived, incursions of Anasazi farmers in the area are difficult

to detect. The majority of Anasazi sites in the area appear have been described as camps with ceramics, lithics, ground stone and features (Baker 2000).

Western Kaiparowits Plateau

The perennial but flood-prone Paria River and its tributary Cottonwood Canyon, mark the eastern boundary of the Grand Staircase and western margin of the Kaiparowits Plateau. In terms of site distribution, the western Kaiparowits is remarkably shy of Formative residential sites. Agriculture along the Paria itself would have been extremely risky and appears to have been quite limited. Farming the benches of the western Kaiparowits benches was limited by a lack of precipitation.

The Kaiparowits survey sampled each of the major benches on the plateau (Geib et al. 2001). Most are separated by major canyons, with some springs and shelters but, in all, they offer few agricultural opportunities. Small camps and lithic scatters indicate foraging was less constrained by the lack of precipitation or live streams.

Between the arable uplands of the Fiftymile Mountain and the high site density of the eastern Grand Staircase there is evidence for a limited pattern of use during Basketmaker III and early Puebloan times. While there are few true farmsteads

recorded, dispersed sheltered camps and occasional granaries are found in association with canyon seeps and springs. Assigning cultural affiliation to these sites is often problematic due to lack of associated ceramics but both sand tempered plain gray pottery and Emery Gray are known to occur.

The evidence for a pattern of summer agricultural camps and limited/isolated storage tethered to the Grand Staircase residential sites suggests a logistically organized pattern is not unlike that suggested for the Grand Staircase during the early Puebloan period (see page 173). At any rate, residential architecture is extremely rare suggesting that winter residences occur elsewhere. The Kaiparowits sample survey testing provided radiocarbon dates from the late Archaic, Formative, and Post Formative periods (Table 37).

During the late Pueblo II period evidence of trade or a route identified by a series of sites, from the west to Collet Top or Fiftymile Mountain, has not been identified. Cached corrugated vessels, however, are known from the West Clark Bench area near what might have been the most expedient route from the Grand Staircase east to Little Valley and onto Fiftymile Mountain via Mudholes or Steer Canyon, but this pure conjecture (see Figure 159).

Site No.	Lab No	Material C13/12	Context	BP age	2 sigma range	Cal curve intercept
42Ka1323	Beta 155678	Horn Flaker (-20.3) (bone collagen)	Tibbet Cave	1030 $\pm$ 40	AD 960 to 1040	AD 1010
42Ka4662 (NNAD)	Beta-144224	Bone Collagen (-20.0)	Next to Hearth (F2) in a test unit	80 $\pm$ 40	AD 1680 to 1745 AD 1805 to 1935 AD 1945 to 1955	AD 1950
42Ka4575 (NNAD)	Beta-144225	Bark (-21.9)	Bottom of Shallow Basin Hearth (F1)	400 $\pm$ 40	AD 1430 to 1525 AD 1560 to 1630	AD 1460
42Ka4749 (NNAD)	Beta-144226	Juniper seeds (-21.0)	Upper fill (F1) of basin hearth (F6) in test unit	1680 $\pm$ 40	AD 255 to 435	AD 390
42Ka4750 (NNAD)	Beta-144227	Juniper seed (-21.8)	Buried cultural stratum (F6) in test unit	880 $\pm$ 40	AD 1035 to 1250	AD 1175
42Ka4547 (NNAD)	Beta-144228	Charcoal (-21.2)	Shallow Basin Hearth (F1)	2200 $\pm$ 40	BC 380 to 165	BC 350, 310, 210
42Ka4552 (NNAD)	Beta-144230	Charcoal (-25.0)	Slab-lined Hearth (F4)	1730 $\pm$ 50	AD 215 to 420	AD 330
42Ka4552 (NNAD)	Beta-144229	Twig (-22.2)	Lower fill of midden (F1)	3930 $\pm$ 30	BC 2480 to 2330	BC 2460
42Ka4794 (NNAD)	Beta 155679	Arrow Shaft (reed) (-24.8)	Rose Shelter	860 $\pm$ 40	AD 1040 to 1260	AD 1190

Table 37. Radiocarbon dates from all periods on the western Kaiparowits Plateau (after Geib et al. 2001).

SITE DESCRIPTIONS

The following site descriptions review Late PII Anasazi sites dated, excavated, or otherwise of interest. The review suggests that if the entire distribution of structural sites on Fiftymile Mountain and within the Escalante drainage is considered, site architecture can be characterized as generally small-scale and highly variable in form. Residential sites may or may not have large volume on-site storage capacity – although most on Fiftymile seem not to. Sheltered camps, not unlike those described for the Fremont occur but are more formal. Aspect for most suggests warm season use. Both open pueblos and sheltered rooms with south aspect suitable for winter residences occur. Large rectangular masonry rooms, sometimes with support pillars might suggest a community structures – at least during the summer. The vast majority of ceramics on these sites are Late PII sand tempered Anasazi types that have much in common with the Virgin Series but at least some may have been made locally. Agriculture was oriented to upland dry farming, as opposed to canyon farming that predominated during the Wide Hollow phase, a significant difference. Associated architectural types include field houses and a large number of isolated granaries which, to date, have not been satisfactorily incorporated into any existing land-use pattern. Middens on Fiftymile are thin and may indicate periodic or even seasonal use of the sites.

The Coombs site and Lampstand cluster, although apparently contemporary with the Fiftymile Mountain sites, have more traditional, self-contained layouts consisting of both storage and residential rooms. In aggregate, the population at Coombs was large by any Virgin/ Kayenta standard. The Lampstand site layout is not unlike that of Structure A at Coombs. While it is much smaller, the site may have been part of a larger dispersed community. Occupation of both sites appears to have been continuous but relatively short, possibly just a few generations.

WESTERN BENCHES OF THE KAIPAROWITS PLATEAU

42Ka4794 Rose Shelter

42Ka4794 is a small, east aspect shelter located on Jack Riggs Bench at an elevation over 5,500 feet. The site was tested during the Kaiparowits Plateau Class II sample inventory and found to have multiple cultural layers all thought to be a result of Formative use. Rose Spring Corner-notched projectile points, a single “Anasazi” sherd, chipped stone, ground stone and scrap bone indicated it functioned as a short-term hunting camp. A common reed (*Phragmites communis*) arrow shaft fragment yielded a date of Cal A.D. 1040 to 1260 (Beta-155679) thought to be contemporaneous with the occupation of Collet Top and Fiftymile mountain.

42Ka1323 Tibbet Cave

Tibbet Cave, recorded during the Kaiparowits Coal Project era, was revisited and the site form updated during the Kaiparowits Plateau Class II sample inventory (Geib et al. 2001). A date of Cal A.D. 960 to 1040 (Beta-155678) was obtained on a “horn flaker” collected from the surface of the alcove. The horn flaker is an artifact type Geib associated with BMII flaking techniques (Geib 2000). The Formative date was disappointing but also of interest for that very reason.

The artifact date and a few corrugated sherds observed in the shelter suggest that this portion of the Kaiparowits Plateau was being used on a temporary basis during the Early and Late Pueblo II periods and perhaps earlier.

42Ka7165

This masonry granary lies on the western margin of the Kaiparowits Plateau overlooking the Paria River. Remnants of the structure indicate it was about 2m in diameter and 80 cm high. Its location is not difficult to access. Nearby arable settings include the Paria River alluvium nearly 1,000 ft. below or, more likely, dry farming the sandy uplands

of Brigham Plain at 5,600 feet. No artifacts were encountered by the BLM crew.

M. Zweifel dated a corn cob (apparently eight row) Cal A. D. 1020 to 1160 (Beta-346332). The intercept date is Cal A.D. 1030. A review of the calibration curve indicates that a date in the first half of the A.D. 1100s is a nearly equal possibility.

**42KA2189, 42Ka4532, and 42Ka4353
(cached vessels east of the Grand Staircase)**

42Ka218 consists of a single ceramic vessel cached in a small rock shelter located in a tributary of the Paria River. The short tributary heads below Brigham Plain in the Tropic Shale of East Clark Bench. The ruggedness of the area, saline soils, and sparse vegetation of the immediate area, seem to offer few resources to exploit. The area does, however, offer a relatively direct route between the Anasazi sites on the Grand Staircase and the Colorado River about 25 miles east. The vessel is a Moenkopi (style) Corrugated jar with a yucca fiber net carrying strap (Figure 159a). The yucca fiber carrying strap was AMS dated (Beta-128987) A.D. 885 to 1020 (95% level of probability) with an intercept of Cal A.D. 980. Even the outside date of A.D. 1020 is probably too early a date for this pottery type; the earliest tree-ring dated corrugated vessels in the Kayenta date closer to A.D. 1050 (P. Geib personal communication 1999). I note, however, at 42Ka2664 in Kitchen Corral Wash, a dated burial with a late Pueblo II ceramic assemblage that yielded a similar date; A.D. 665 to 1250 with a midpoint of A.D. 985

(Beta 23056). These are the earliest dates for late Pueblo II ceramics on the Monument.

Another isolated vessel (Figure 159b), reported by a collector, is a corrugated jar said to have been cached near a cist (42Ka4532) and a nearby late Pueblo II camp (42Ka4531) on East Clark Bench. The vessel appears to be Moenkopi style but is only about 40 % corrugated.

An isolated or cached Moenkopi style corrugated vessel (Figure 159c) was found in association with a Glen Canyon Style 5 petroglyph panel at 42Ka4353 on the east side of East Clark Bench near Broken Arrow Cave.

A fourth cached vessel is known from the lower Paria Canyon - a natural travel corridor between the Grand Staircase and the Kaibito Plateau south of the Colorado River. Jennings (1967) reports the collection of a North Creek Corrugated jar found inverted in a small overhang (NA 9788). This vessel is thought to be curated at the Museum of Northern Arizona.

Sites on East Clark Bench and the general vicinity tend to be oriented towards limited activities i.e. hunting, gathering, and production of rockart. As such, they are part of the dispersed site pattern noted earlier. The occurrence of cached and isolated vessels may also reflect use of the area as a travel corridor during late Pueblo II times. The transmission of vessels, people, and ideas through the Clark Bench area during the early eleventh century suggests a travel route and means of contact between the Anasazi of the Grand Staircase to the west and the Kayenta region east of the Colorado River early in the Late PII period.

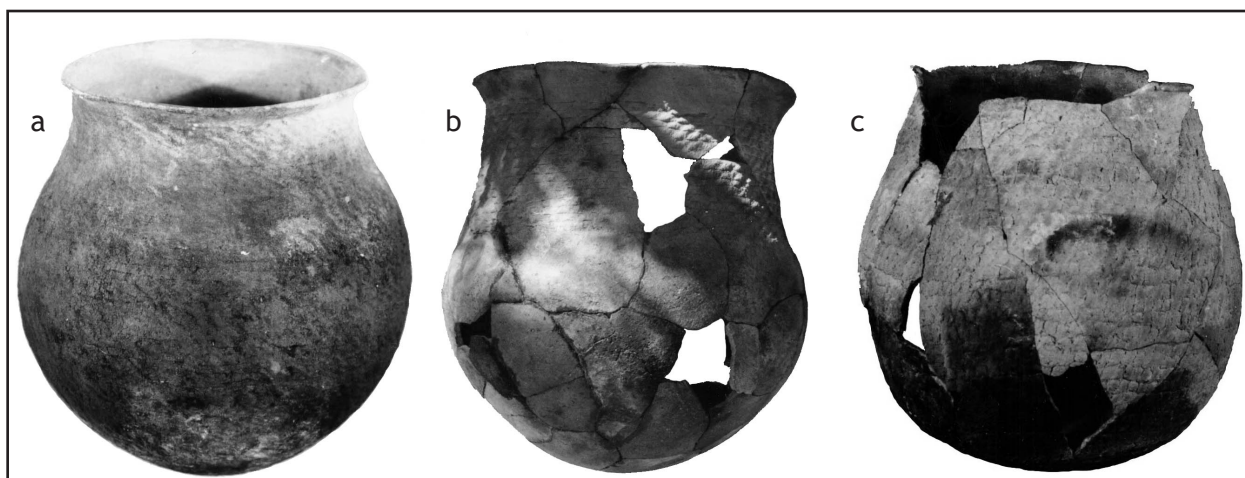


Figure 159. Cached vessels from East Clark Bench; a) 42Ka2189, b) 42Ka4532 (vicinity), c) 42Ka4353.

BOULDER VALLEY, CIRCLE CLIFFS, ESCALANTE VALLEY

42GA34 Coombs Village

Located in the Boulder Creek drainage at the base of the Aquarius Plateau, the Coombs site is the largest and most intensively excavated Anasazi site in the region (Lister 1959; Lister et al. 1960; Lister and Lister 1961; Latady and Prince 1994). Including investigations carried out since 1970 by Anasazi State Park staff, nearly 100 rooms have been excavated (Prince et al. 1997). Virtually on the GSENM boundary, the site is central to the interpretation of both Anasazi and Fremont settlement and subsistence studies in the region. Published descriptive reports and curated collections at Anasazi State Park make archival studies an attractive research opportunity.

Coombs Village tree-ring dates range from just after A.D. 1129 to 1169 - coeval with Late PII and early PIII sites described on the Grand Staircase, as well as Fiftymile Mountain. Describing the social and cultural context of the region during this period is the subject of this section. Coombs site structure; its layout, room types, construction history, and artifact associations are briefly reviewed below to compare and contrast with local patterns in the surrounding area.

Although no Fremont components have been identified on the Coombs site, it lies within the region traditionally occupied by them. Prince et al. (1997) report that about 5% of pottery on site is Fremont. The majority of all wares are tempered with locally available basalt in the Fremont tradition; the remainder is sand tempered in the Anasazi tradition. Styles and some types (Tsegi Orange Ware) originate in the Kayenta but are also common on the Grand Staircase and eastern Arizona Strip. Comparing the relative frequencies of ceramic traditions Lister (1960:200-203) recognized both Fremont influence and Anasazi trade wares noting that "the next door people, those so-called Fremont Pueblos, came in a close second" (Lister 1960:203). The Late Formative Fremont section of this volume describes several sites apparently contemporaneous, or even later, than Coombs (p. 217). Most pottery (and it is abundant with 41,416 sherds and 259 complete or restorable vessels), however, is "Coombs Variety"- a basalt tempered,

occasionally polished, sometimes with a fugitive red wash, local pottery type. Styles are typical Anasazi, temper is typical Fremont; the "pottery as people" approach would indicate a blend of the two or a sort of reciprocal assimilation of culture traits. The ceramic assemblage is homogeneous across the site; Lister notes no temporal trends, ware preferences, or nonrandom distributions.

Projectile point preferences include relatively high percentages of Bull Creek and fewer Parowan Basal notched and stemmed types. Noted here the Alvey site level III, also late Formative, had a high percentage of Bull Creeks projectile points. Few, if any, appear to be associated with earlier Fremont deposits. Prince et al. (1997) report nearly 120 Bull Creek points collected since 1970. Lister's considered them the dominant type at Coombs (Lister and Lister 1961:99). On the eastern Arizona Strip, Grand Staircase, and Fiftymile Mountain, the Bull Creek style typically accounts for about fifty percent of Pueblo II/III projectile points (Figure 156).

Architecture

Reasonable comparisons of Coombs architecture can be made with pueblos on the Grand Staircase and Eastern Arizona Strip, as well as the Kayenta region. It is not difficult to segregate the Coombs village layout into discrete roomblocks and structure types. Lister's and Ambler define them as Structures A and a group consisting of Structures I, H, and G. South of the roomblocks are a series of individual pithouses and jacales. Structure A, an "L" shaped pueblo stands out as a formally planned and executed masonry roomblock (Figure 160). It has distinct similarities with layouts found on the Eastern Arizona Strip and the Grand Staircase (Figures 94, 96, 121). It has been argued that similar pueblos in House Rock Valley seem to represent short-term construction events by household-sized immigrant groups seeking out new, unappropriated agricultural settings. The authors describe the probable construction history of Structure A as beginning with the two parallel walls of the storage legs using subsequence insertion of room partitions, (cf. the "ladder" type construction) (Cordell 1996, Cameron 1999), followed by the separate construction of the several residential rooms. Initial construction of the storage room block infers a predetermined volume of storage eventually associated with three or four

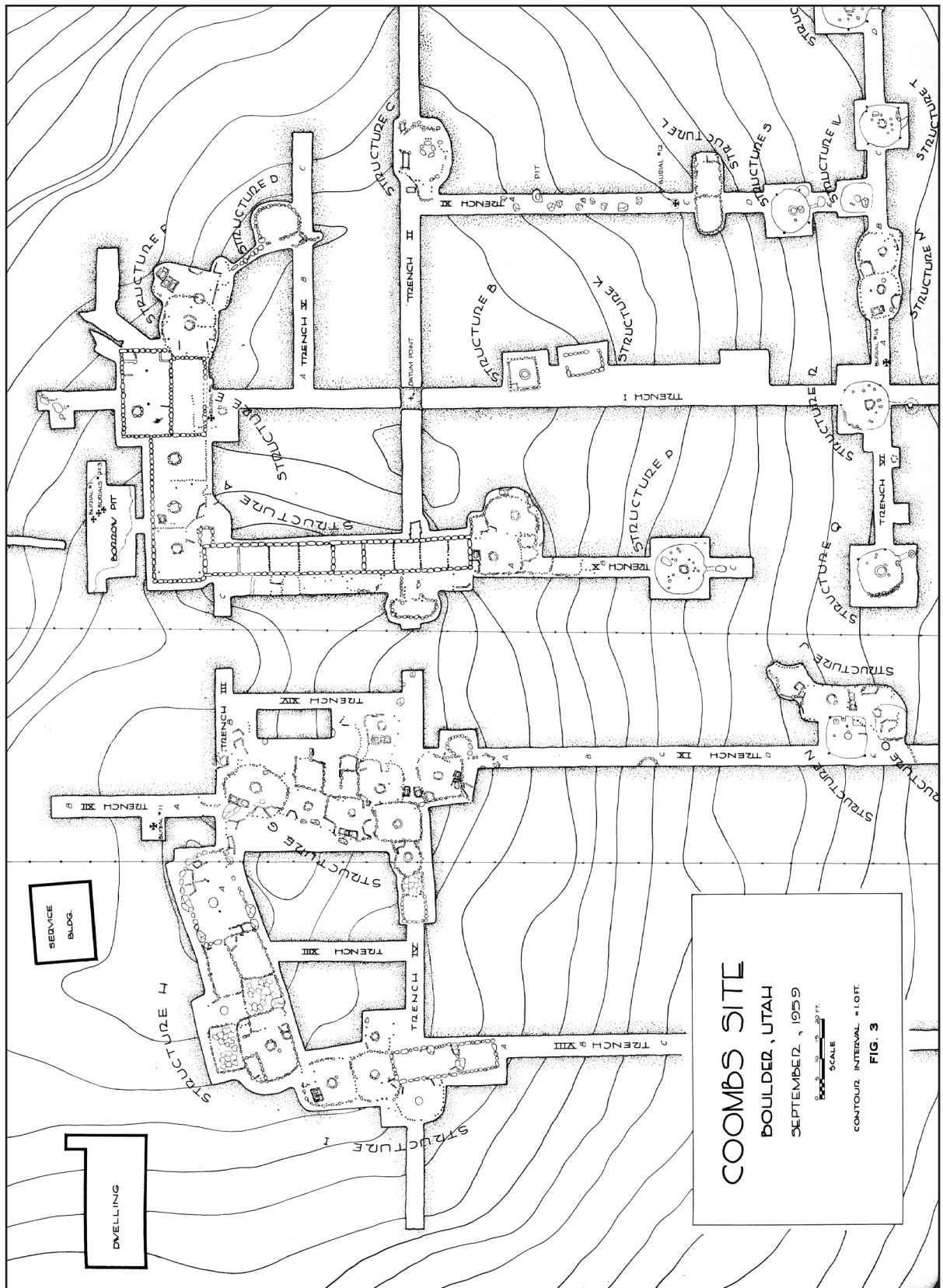


Figure 160. Coombs site plan map (after Lister et al. 1960).

residential rooms. The storage room-to-residence ratio is 3 or 4 to 1 which is comparable to that in the Virgin area. What is decidedly not typical of Virgin storage room construction, is the lack of clay/slab pavements in the store rooms.

Roomblocks I, H, and G contrast greatly with Structure A in that they were mostly constructed of jacale and grew by accretion rather than plan - although they seem to represent household units with some storage capacity (some with pave floors, most without). Their general layout suggested to the authors that they formed a plaza. Residential jacales outnumber potential store rooms considerably. In this regard, the roomblocks are unlike any known in the eastern Virgin region. In terms of room construction and layout they are reminiscent of Small Jar Pueblo near Segazlin Mesa (Lindsay et al. 1968). Occupied around A.D. 1100, the pueblo differed by having deep storage pits within the rooms and a semi-subterranean room that held five mealing bins.

As Geib et al. (2001:385) has pointed out "mealing rooms" are a common architectural type on Late PII Kayenta sites. They have not been identified on Virgin sites; occasional mealing bins occur but they are not common. While Coombs has no single room devoted to processing maize, it does have some two dozen mealing bins in aggregate that are widely distributed over the site. They are associated with all of the roomblocks and in many cases are located in the residential rooms themselves. In addition, nearly all the rooms with hearths have some sort of small bin. As noted in the Virgin section, the intensive processing of maize is directly related to storage capacity requirements and construction techniques. Ease of transport is an additional advantage of refining maize, particularly if mobility was an important consideration.

Pithouses

Ten pithouses have been excavated at Coombs (Structures R, Q, P, S, N, O, T, U, V, W). They are moderately deep, earthen-walled with support beams incorporated into the walls, and most have vent shafts. Floor features include slab-lined hearths, (nonpermanent) deflectors, ladder sockets, and some have loom anchors. Those identified all lie south of Structure A and appear to be isolated from any ancillary surface structures. Roof support beams are plastered into the wall, as is the case on

the Grand Staircase during the late PII period - although known pitstructures early in the period are generally masonry-lined. Coombs pithouses seem to span the full range of site occupation. Trash in the fill of most suggests they may have fallen into disuse before the site was abandoned. The lack of a kiva seems an obvious departure from a site interpreted to be Kayenta affiliated. (Lister 1959; Latady and Prince 1994). A similar pit structure is reported from the Escalante Valley (Janetski et al. 2012). Deep, earthen pithouses without benches appear on the Grand Staircase after A.D.1050 (see Figure 88) and are the dominant pithstructure type during Pueblo III times (see Figures 103, 107).

Also on the south margin of the site are jacale surface structures used as residences with associated activity areas, mealing bins, and at least some with storage rooms. In one instance such a structure (J) overlies a pithouse (N). Whether these apparent household units postdate the pithouses is unknown. Prince reports a similar self-contained jacale structure on the north edge of the site with mealing bins and small cist-like features incorporated into the walls. An Emery Gray jar was associated (Prince 2000).

Ceramics

Because Coombs variety pottery is distinctive and easily identified, its distribution should be a good indication of regional interaction. In fact, its distribution seems to have been quite limited. A total of 17 sherds were reported from the extensive excavation and survey on Fiftymile Mountain (Fowler and Aikens 1963), a mere 15 grayware sherds from the Escalante Desert and none from the Kaiparowits Plateau (Suhm 1959), or the Escalante River corridor (Keller 2001; Harris 2005). Talbot et al. (2000) report some Coombs variety sherds from the Circle Cliffs area. While Virgin pottery appears common in all of these areas, no Coombs Variety has been reported from the Grand Staircase.

As regards the origin of Tusayan Gray and White Wares, separation of Kayenta versus Virgin pottery was problematic because little work had been done in either the Virgin or the Kayenta areas. Red wares, however, may be a more reliable indicator of cultural affiliation. Lister (1964) reports that about one third of the substantial red ware collection was what is now called Shinarump Red Ware (n-813, including 10 vessels). Tsegi Orange Ware (n-1,682,

plus 17 vessels) accounted for the remainder of the assemblage. The 1959 excavations, however, yielded 695 TOW of which 322 were local Coombs variety; Middleton Red Ware (Shinarump) numbered 677 which nearly equaled both. Lister identified no Virgin Series white wares which seems at odds with the quantity of Shinarump Red Ware. Prince et al. 1997 report that Richard Ambler, one of the original excavators, came to question the early White Ware designations as Tsegi Series. More recent excavations, however, seem to support Lister's analysis in terms of types and their frequencies (Prince 2000).

Overall, about 5% of the ceramics at Coombs are Fremont (Latady and Prince 1994). The contexts appear to be sound and seems to be clear evidence of Fremont-Anasazi interaction. There remains, however, some question of whether the Emery Gray sherds and vessels were locally manufactured, represent tradewares, or even curated vessels. The Coombs site yielded more tree-ring dates than any other site excavated during the Glen Canyon Project (Table 38). Twelfth century cutting dates, in association with complete Fremont vessels seems to support the contention that the Fremont occupation of the Escalante drainage continued into the late A.D. 1100's.

The interpretation that much of the pottery at Coombs originated in the Kayenta district seems strained - if only in a logistical sense. Lister was apparently not aware that very similar assemblages of Tusayan Grayware (but also Shinarump Whites and Grays) and White Ware, mostly Virgin series but some Kayentan, as well as Tsegi Orange and Shinarump Red Ware occurred on the eastern Virgin region. Although equally distant, a route of transmission for such an assemblage over the Kaiparowits Plateau is plausible. A brief review of the final sherd tallies, however, seems to suggest that the majority of both white ware and utility types were locally made (Lister and Lister 1961:34).

Subsistence

The economic base of the Coombs settlement remains a the key issue. The construction history and large storage capacity of the Structure A roomblock strongly suggests that maize was at least the intended basis for the economy. On the other hand, the plaza layout formed by room blocks I,H,

Pithouse (F-88)	
COO-13-2	1041-1165+vv
Pithouses (F-117)	
C-18-1	1049-1169+vv
Pithouses	
COO-8-2	941p-1129+v
COO-17-1	1056-1135v
COO-8-1	1018-1142vv
COO-8-3	1047g-1164+vv
Roomblock "U" shaped	
COO-7	1054-1159+vv
Roomblock "L" shaped	
COO-15-1	1068-1160+b
COO-15-2	1047-1164+vv

Table 38. Tree-ring dates from 42Ga34, the Coombs site (Bannister, Dean and Robinson 1969).

and G appears to have a larger number of residences and less emphasis on storage. Milling bins, however, are numerous and common to both areas which might indicate a reduced requirement for large volume storage. Prince (2000) is in agreement with the Lister's noting that vegetative materials are rare on the site due to poor preservation of perishable remains (Lister and Lister 1961) but he points out that there is "little evidence to suggest that subsistence was oriented around anything but maize agriculture, supplemented by wild plants, including weedy annuals, and wild game" (Prince 2000:82).

The abundance of animal bones found indicates 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 recovered, followed by bighorn sheep (Lister and Lister 1961). The Coombs site yielded over 20,000 fragments of deer and bighorn bone. A recently reported artiodactyl index of .985 is substantially higher than the Four Corners Anasazi mean of .632 (Arakawa et al. 2013). Faunal analysis indicated that the bone represented entire animals being transported to the site (Lister et al.1960). Coombs is situated well to exploit big game and as Jennings's (1978:234) pointed out, deer was the favored game of the Fremont. Like the Big Flat pithouse cluster, it is conceivable that the numerous jacales and pithouses were primarily occupied during the winter months relying on big game and some stored maize.

Climate and Cultural Correlations

Ceramic cross-dating and tree-ring dates for Coombs correspond closely with what has been called Megadrought 3 that occurred A.D. 1130-1177 (Benson and Berry 2009). Drought could have been the initial impetus for Anasazi population movement to both Fiftymile Mountain and the Boulder Valley. The Structure A "L" shaped layout, common on the eastern Arizona Strip, seems to be in place in House Rock Valley sometime after A.D. 1100 (see Figure 121). Ceramic types and styles associated with pueblos there are not unlike those at Coombs (McFadden 2004). It has been proposed that this linear pueblo layout then expanded onto the Grand Staircase - part of the "PII expansion," about the same time that Coombs was first occupied. Tight chronological control is critical for correlating climate change and cultural response in the region; if the expansion occurred during the relatively wet period A.D. 1050-1130 it could be viewed as population growth; if it occurred during the mid A.D. 1100's during drought conditions, the implication might be that some Anasazi were forced to relocate.

In addition to the tree-ring dates reported in Banister et al. (1969) (Table 38), and Robinson and Cameron (1991), two additional dates are reported (Prince et al. 1997) ; 954p-1095+vv and 1003p-1165+vv. Provenience information for these timbers is not available, however they are in general agreement with existing dates from the pithouses and both the "L" and "U" shaped roomblocks whose dates cluster in the A.D. 1150's and 1160's.

42GA2672 Lampstand Pueblo

Lampstand Pueblo is the largest of a cluster of seven sites located on, under, and below the rim of the Shinarump cliff line in the Circle Cliffs area (see Figure 135). The cluster consists of three roomblocks; two on the mesa-top (42Ga2672, 2673), one on the alluvium below (42Ga3749) and two granary sites under the rim 42Ga3750 and one thought to be associated with 42Ga2672. The relationship of these sites is not clear, but ceramics suggest they are roughly contemporary. In addition 4 small structures (42Ga3748, 42Ga3749) are tied into large boulders on the slope below. Minimal

artifacts and orientation suggest temporary shelter or possibly a field house function roughly contemporary with the pueblos.

The Lampstand cluster sites were recorded by BLM archeologists in the 1980's. It was later investigated by Brigham Young University under a cooperative agreement with the GSENM (Janetski and Talbot 1997). Of the seven sites, Lampstand Pueblo (42Ga2672) is by far the largest consisting of 12 masonry rooms arranged in a rough "L" shape (Figure 161). The northernmost segment appears to consist of three larger rooms with storage rooms appended on the south. Additional poorly defined rooms and segments make up the remainder of the pueblo. Construction techniques used to floor the possible storerooms were not investigated.

With the exception of the Coombs Site, Lampstand ruin is the largest pueblo recorded in the upper Escalante drainage. Juniper charcoal from an extramural test trench #2 yielded a date of A.D. 885-1035 (Beta 108491) which is considered too early. However, a date of A.D. 980-1215 (Beta-108490) from a small, deep, test pit within Room 7 falls within the range of the associated late PII ceramics (Table 39). Forty-eight percent of the ceramic assemblage is Coombs Variety (Baadsgaard ND). Based on the Coombs tree-ring dates and assuming those dates represent the production of Coombs variety, 42Ka2672 dates between A.D. 1130 and 1170.

In an attempt to achieve less ambiguous dating, corn cobs from the presumably associated storage granary (42GA3750) and a charred cob from the Lampstand Pueblo (42GA2672) were dated. The granary associated cob (surface) yielded a date of A.D. 665-1005 (Beta-117938). In the absence of any early Anasazi ceramics, this date is assumed to represent an earlier Fremont occupation. The cob from the Lampstand Pueblo yielded an AMS date of A.D. 985-1220 (Beta-117939). This date is nearly identical to the original charcoal date (Beta-108490). A review of the rather flat calibration curve indicates that the intercepts could easily be as late as A.D. 1150. The suggestion of an Anasazi-Fremont occupational sequence for the Lampstand cluster is entirely based on radiocarbon dating. No Fremont ceramics or artifacts have been reported.

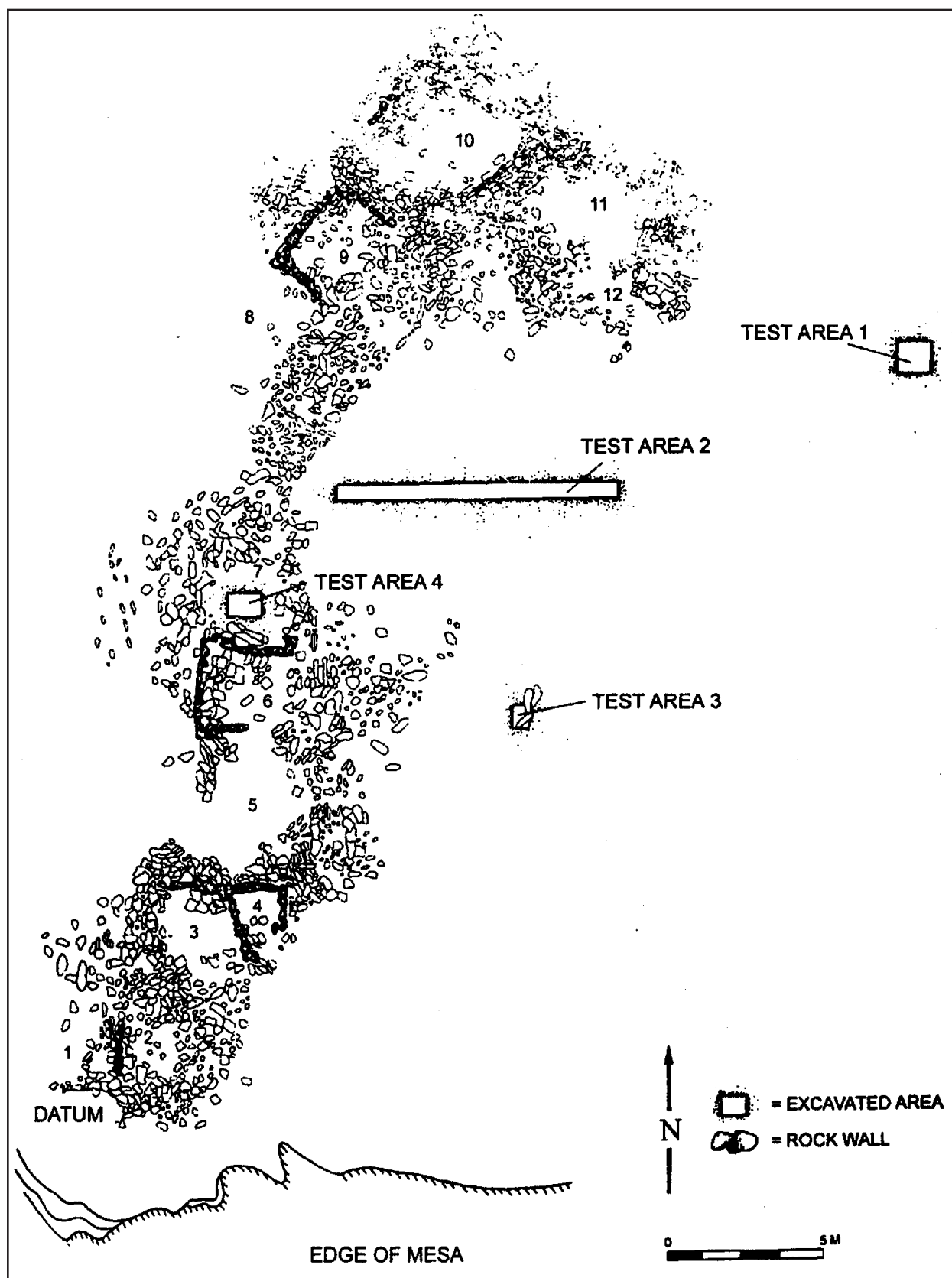


Figure 161. 42Ga2672, Lampstand site excavation map (after Baadsgaard and Fergusson 1999).

Site #	Laboratory Number	Material	BP age	2 Sigma Range	Cal.
42GA2672	108490	charcoal	970+/-60	A.D. 980-1215	A.D. 1035
42GA2672	108491	charcoal	1060+/-50	A.D. 885-1035	A.D. 995
42GA3749	108492	charcoal	1300+/-60	A.D. 645-880	A.D. 695
42GA3749	108493	charcoal	1220+/-60	A.D. 675-975	A.D. 800
42GA3749	108494	charcoal	890+/-70	A.D. 1010-1275	A.D. 1175
42GA3749	108495	charcoal	1280+/-60	A.D. 650-885	A.D. 738
subsequent BLM maize dates					
42Ga3750	Beta 117938	corn cob	1200+/-80	A.D. 665-1005	A.D. 865
42GA2672	Beta 117939	corn cob	960+/-60	A.D. 985-1220	A.D. 1035

Table 39. Radiocarbon dates from the Lampstand sites -1997 field season (Janetski and Talbot 1997; Baadsgaard and Fergusson 1999).

42Ga3749 Lampstand lower roomblock (Baadsgaard and Fergusson 1999)

The lower roomblock occupies a much more traditional setting than those on the mesa top. At an elevation of 6,360 feet, it lies in close proximity to arable soils (Figure 135). The roomblock is oriented east-west and consists of a rectangular jacal room approximately 2.5m x 1.75 with an earthen floor. The sole floor feature was an unlined, vertically walled pit. Structure 2 abuts Structure 1 on the east and sharing a common jacal wall and masonry walls on the other three sides (Figure 162). interior measurements of the structure are about 2m x 2m. Although looted, remaining portions of the floor was paved with large slabs chinked with smaller rock. Unlike Structure 1 it yielded abundant Cheno-am seeds and corn indicating to the authors that it functioned as a storage room.

Dating

Four radiocarbon dates were obtained from charcoal: two from Structure 1 sediments and two from a stratified midden nearly 20m downslope. The lower midden deposit, Stratum 1, yielded a date of A.D. 665-785; the overlying stratum dated A.D. 720-885. These deposits are said to have held PII/PIII ceramics. The Structure 1 date from floor sediments yielded a similar date of A.D.675-800.

Wall sediments from the jacal room produced the only date congruent with the ceramic assemblage Cal. A.D. 1010-1275 with an intercept of A.D. 1175 (Table 24). As was the case for 42Ga2672 corrugated ceramics (Tusayan and Moenkopi types) predominate but in contrast only 3 percent of the assemblage was Coombs variety.

Discussion

Unlike typical pueblo settings on the Grand Staircase, the two primary sites in the cluster are located in relatively exotic, defensible settings. 42Ga 2672 is comprised of three larger, presumably residential rooms with an attached block of substantial masonry rooms. In addition, a less formal series of rooms are appended on the south. This "household" layout of has some precedent in the Virgin area (see Figure 121). The assumption that the nearby granaries (42Ga3750) were temporally associated was not borne out by the Wide Hollow Phase radiocarbon date on a maize cob.

The lower roomblock (42Ga3749) occupies a more traditional setting adjacent to probable fields. Particularly notable is the slab paved storage room - although sharing a common wall with the presumed residential room is not a common Virgin construction method.

That no Fremont ceramics were recovered from any of the sites, despite the fact that five of the dates

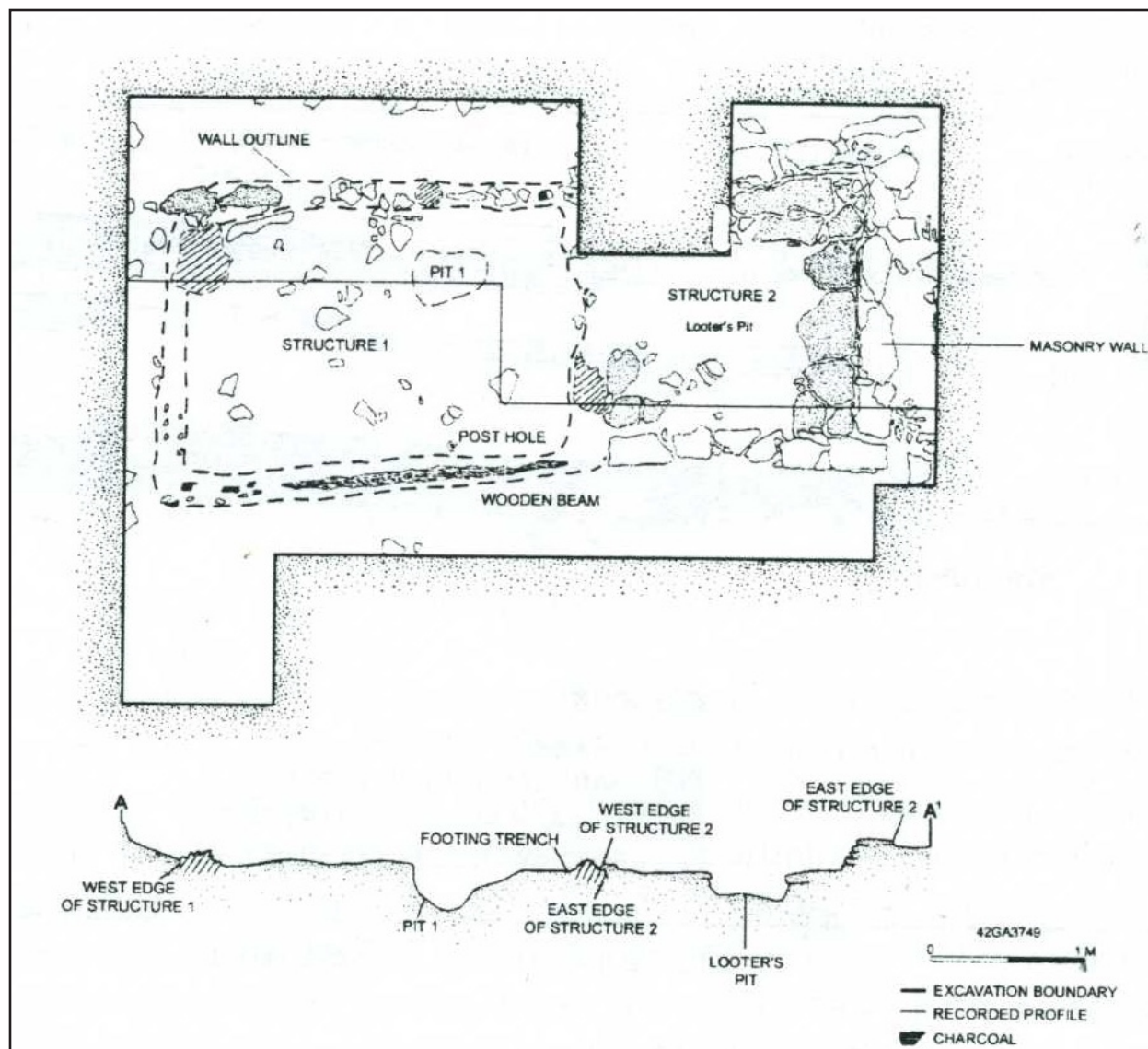


Figure 162. 42Ga3749, lower roomblock excavation plan map (Baadsgaard and Ferguson 1999).

fall into the Wide Hollow Phase could simply be a function of sampling error, a lack of interaction, or possibly related to when the site was occupied. It is possible that Fremont pottery decreases over time in the region. Likewise, we might expect Coombs variety pottery decrease after that site was abandoned. Both changes in ceramic frequencies might prove to be useful measures of interaction.

42Ga4983

This site is a large, open architectural site in an upland dryfarm setting at 6,500 feet in the Circle Cliffs locality. It consists of a large, roughly 'L' shaped masonry roomblock with additional

structural features and an extensive midden with large numbers of ceramic, lithic and groundstone artifacts. Ceramics are said to be dominated by corrugated types (Coombs variety) but also present are plain gray, white ware, and red wares. Another open residential site, 42Ga4642, lies 350 meters away. The site was vandalized shortly before it was recorded in June 1999 as part of the GSENM/BYU cooperative agreement.

A timber collected from the looters backdirt (UUM-225) was tree-ring dated 1083 $\pm$ vv determined by a "ring count beyond 1050." While the single non-cutting date simply indicates that the site postdates A.D. 1083, it is consistent with the Late Pueblo II assignment. The presence of

wood in the back dirt suggests that preservation is good and that excavation may provide additional dates that would allow better control over the Circle Cliffs Anasazi chronology.

**42Ga5169, Arrowhead Hill
(Janetski et al. 2012)**

This is a important site located in on private land overlooking an arable reach of the Escalante River which is under cultivation today. It was investigated in 2003-2004 by Brigham Young University after considerable excavation and inventory had been carried out on the Monument. It proved to be a nearly ideal site to investigate the Fremont-Anasazi relationship. Two discrete components less than 100 meters apart were excavated yielding two Fremont pithouses with associated Anasazi pottery in one and an Anasazi component consisting of a deep pithouse and surface structure with associated Fremont pottery in the other one. Five overlapping radiocarbon dates, two from the Fremont pithouses (Structures 1 and 2), and three

from the Anasazi component (Structures 3 and 4), suggest to the authors that the two components were contemporary.

Two additional radiocarbon dates on one of several deep, earthen storage pits on the Fremont component yielded dates early in the Wide Hollow Phase. Apparently, the deep pithouse was superpositioned over similar earlier features on the Anasazi component (Figure 163). Based on the presence of these earlier, large volume storage features, Janetski (et al. 2012) proposes that at least some of the Wide Hollow Phase population were sedentary, full-time farmers. This is a reasonable inference that additional excavation in the Escalante Valley may well corroborate. Whether it holds true in other agricultural localities, such as Fiftymile Mountain, is an important objective of future research.

The authors believe the excavations provide "...strong evidence that the Fremont and Anasazi peoples were contemporaneous yet ethnically distinct." Whether the two components at Arrowhead Hill were simultaneously occupied has



Figure 163. Structure 3 Anasazi pithouse. Conferring about a novel structure; Joel Janetski (left), Gardiner Dalley (right), Doug McFadden (center) and students. Note large pits similar to those on the Fremont component that were apparently cut away prehistorically by excavation of the pithouse.

not been demonstrated. An examination of the excavation report will be necessary to fully evaluate this assertion, but the position is well-taken.

As regards Anasazi pottery in general, the authors suggest that small amounts of white and red ware suggest trade, while the addition of utilitarian types (generally corrugated) are an indicator of an actual presence. This appears to be a sound criteria for both dating and dealing with cultural affiliation. Floor zone sherds in Structure 3, which the authors date prior to A.D. 1000, consisted of neck banded grayware, redware (San Juan Series), and corrugated types. On the Grand Staircase corrugated pottery of any type has not been dated prior to A.D. 1050, although it does occur earlier in the Kayenta region. This suggests the possibility that the Anasazi immigrants in the region may have had multiple origins.

Based on the Escalante Valley sites with mixed Fremont and Anasazi ceramic assemblages the authors suggest that the Late Formative Period for the Fremont be dropped and that all such sites contemporary with the late Anasazi occupation simply be considered Fiftymile Mt. Phase. This position seems premature. The probability of some kind of Fremont and Anasazi overlap has long been apparent on Fiftymile Mountain, the Coombs site, the Escalante Canyons, and the Escalante Desert. The challenge presented now is to determine its duration, extent, and particularly the nature of the relationship for each of these areas. For that purpose alone the Late Formative temporal unit remains a useful category.

THE GLEN CANYON PROJECT: FIFTYMILE MOUNTAIN EXCAVATIONS

Fiftymile Mountain forms the eastern edge of the Kaiparowits Plateau. At an average elevation of over 7,000 feet it represents a high altitude oasis setting above the Escalante Desert. Geographically it is forty miles from the Grand Staircase physiographic section separated by the rugged, dry, benches and canyons of the Kaiparowits Plateau. It overlooks the Kayenta district to the south just across the Colorado River.

The University of Utah excavations on Fiftymile Mountain were conducted during an eight week

survey and excavation program during the 1961 field season. The eleven sites excavated are briefly described in Fowler and Aikens (1963). Most of the sites have been relocated and plotted on USGS 7.5 minute quadrangle maps produced since the excavations. The original descriptions along with site plans are provided below, as well as more recent observations and comments. Small sites were said to have been excavated completely but larger ones only extensively tested. While Fowler and Aikens do not indicate why these sites were selected for excavation, it appears that there was an attempt to sample the full range of site types found on the plateau. In general, the sites have remained in good condition; they are well defined and retain considerable research potential.

42Ka524 Golden Stairs

The Golden Stairs site consists of two pithouses located at 7,160 feet on a ridge above one of the historic access routes onto Fiftymile Mountain from the bench below. The site's location in a rugged and dissected setting poorly situated for agriculture was considered unique by its excavators. The nearest spring is over 2 miles away. No storage structures appear to be located on site. A nearby granary (42Ka770) with a few corn cobs, a digging stick, and Moenkopi corrugated sherds was assumed to be associated.

The pithouses were located about 7 ft. apart (See Figure 137). Structure 1 was lined with slabs and had an irregular outline measuring 16 t. 8 in. by 12ft. 8 in. On the east was a 6 feet long slab-lined vent shaft. In the center of the bedrock floor was a "D" shaped slab and adobe hearth. Fill of burned adobe and charred beams suggest a substantial superstructure. On the floor were two basin metates and fragments of a broken olla. A partially restorable Moenkopi style jar was collected during a recent re-inventory of the site.

Structure 2 was also lined with slabs but was circular and only 11 ft. in diameter. An adobe rimmed firepit with a slab deflector was set off-center and aligned with a slab-lined vent shaft on the east. Roof and wall construction was undetermined but several charred beams lay on the floor.

Both slab and boulder outlines define pithouses on Fiftymile Mountain. They represent just one of several types of architecture presumably used as

winter residences. The architecture of the Golden Stairs pithouses is neither typical of Fremont or Anasazi architecture off the plateau. Although slab-lined vent shafts at Golden Stairs are reminiscent of the Big Flat pithouses, the Big Flat shafts are much larger and appear to have functioned as lateral entries. Their construction is, however, similar to those on the Grand Staircase during Pueblo I/PII times (see Figure 55) although other aspects of the pithouse are decidedly unlike their Virgin counterparts.

Ceramics at Golden Stairs were more abundant than on any of the other ten excavated sites on the plateau. Of a collection of just over 1,000 sherds, corrugated types predominate followed by Kiet Siel Gray (a late PIII Kayenta plain gray type that now seems questionable). White wares were limited with Dogoszhi Black-on-White the most common type, followed by a few Sosi style sherds. A relatively large number of Black-on-White sherds (88) were unidentified. Small numbers of unidentified Tsegi Orange Ware and a few Middleton Black-on-Red sherds were also recovered.

42Ka539 Ava Site

This is one of the numerous sites with small structures on the mesa located in settings close to, or on, arable soils. Three small, widely separated, circular structures were excavated. Structure 1 is an 8x10 ft. oval of sandstone masonry and uprights. No floor was encountered. Structure 2 was located 100 yards away on the crest of a rise. It was similar in construction and shape to Structure 1. Measuring 8x9 ft., it was constructed of vertical slabs lining an 18" deep pit dug into the dune sand. No formal floor surface or floor features were encountered; a thin layer of compacted brown sand represented a use surface. The overlying fill of 6 to 15 in. of mixed sand and burned clay suggests the structure was roofed. Fifty yards to the southwest was a bedrock metate ringed with large slabs.

East of Structure 2 was an additional scatter of stone, a trough metate, and mano. The excavators interpreted Structures 1 and 2 as "temporary farm houses." Ceramics were restricted to 110 late Pueblo II Anasazi sherds.

42Ka761 Aspen Pueblo

Aspen Pueblo is located in the Gates Canyon drainage at an elevation of 7,200 feet in a favorable setting for agriculture. The drainage heads in a broad sage-covered basin to the northwest and maintains a perennial flow of water.

The roomblock on this pueblo consists of three rooms, 2 with hearths (A and B), and a third with a connecting entryway and no hearth (Figure 164). The "L" shaped portion appears to have been constructed in a single episode – although it is possible that the entire pueblo was built as a unit. Walls were 12-13 courses high. A courtyard measuring nearly 30 feet square, with walls six or seven courses high, adjoined the rooms on the southeast. The courtyard walls abut the "front" wall alignment of the roomblock – a technique on the Paria Plateau called "long wall" construction that is associated with plaza layouts (Figure 125). To the north of the pueblo about 20 feet was a slab-lined hearth 16" in diameter, as well as the remains of a cist.

The total ceramic collection was remarkably small consisting of only 249 late Pueblo II sherds. The low sherd count may be misleading – there appears to be potential for midden deposits to the southeast. An unusually high percentage of the sherds were red ware (see Appendix C, Table 3). All were typed as Shinarump Red Ware (SRW), no Tsegi Orange Ware was recovered. The high frequency of SRW not only indicates a close relationship with the eastern Arizona Strip/ Grand Staircase but suggests that the site may postdate A.D.1150. No typical Virgin style paved storage rooms are apparent in the layout.

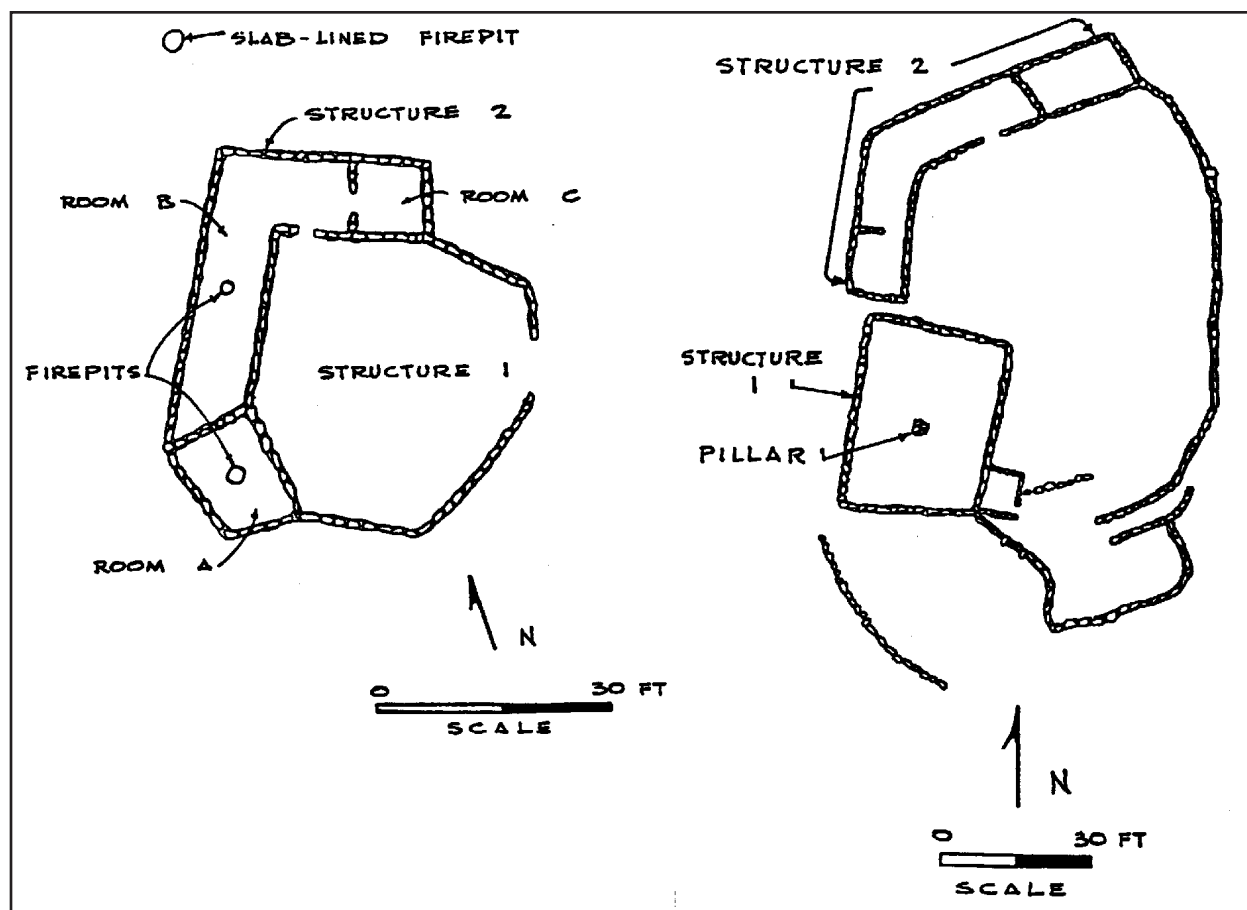


Figure 164. Pueblo architecture, Fiftymile Mountain: 42Ka761, Aspen Pueblo (left); 42Ka331, Three Forks Pueblo (right) (Fowler and Aikens 1963).

42Ka526 Pocket Hollow Farms I

Located above the arable bottom of Pocket Hollow draw, the only structure on this site was a "U" shaped wall of masonry measuring 7 ft.x14ft. and open to the northeast. Charred poles, small post butts and scattered charcoal indicated a light superstructure.

Several hundred late Pueblo II sherds and various ground stone tools suggest an intense but probably seasonal use of the site. Location, size, and lack of complexity indicates this site functioned as a field house – although the sherd count seems high for this function. Small masonry structures, varying in shape from circular to square and located near arable fields, are a common site type on the mesa.

42Ka528 Pocket Hollow Farms II

Located nearby in a similar setting to Pocket Hollow Farms I, this site displayed two low-walled,

lightly constructed semicircular structures, the remnants of two others, and a probable slab-lined cist. Several hundred sherds indicate a Late Pueblo II Anasazi occupation. A trace of Emery gray and a basalt mano (common on Wide Hollow Phase sites in the Escalante area) are the only suggestions of Fremont material culture.

42Ka331 Three Forks Pueblo

This was said to be "the largest single site recorded on the plateau" (Fowler and Aikens 1963:21). Similar in layout to Aspen Pueblo, it is a modified "L" with an enclosed courtyard (Figure 164, 165). The northern leg of the pueblo measured 10ft x 80ft, lacked any floor features, and could have functioned as a series of storage rooms, although neither partitions nor floor pavements were encountered. South of the roomblock is an exceptionally large room measuring 21ft x 33ft, with original wall height estimated to be 6 feet.

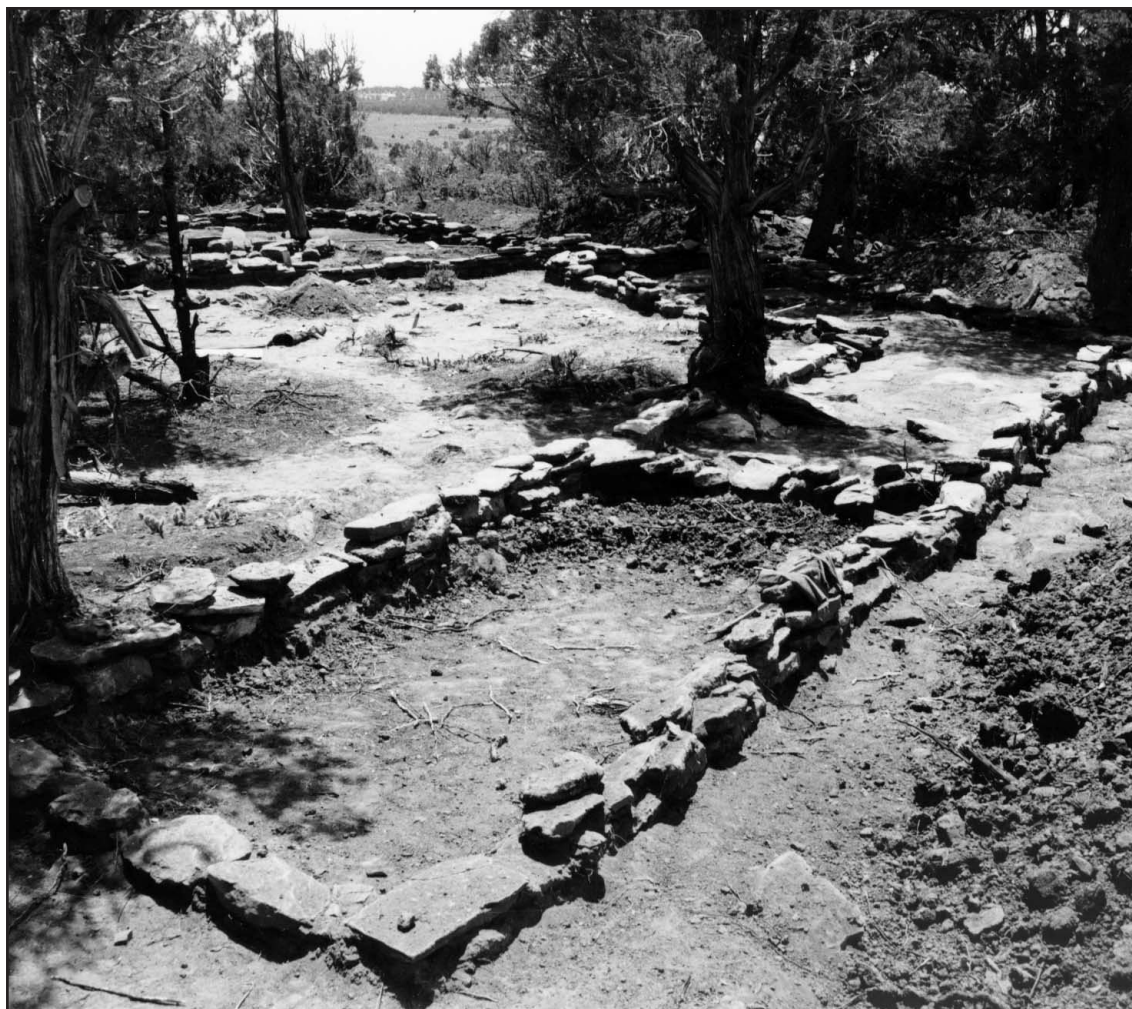


Figure 165. 42Ka331, Three Forks Pueblo. View to southwest over roomblock (BLM files).

This structure had a central pillar similar to that at Mudholes Pueblo Structure 1 which was similar in size and layout. No interior hearth is described. It should be noted that if these large rooms served as residences during the winter that they would have been exceptionally difficult to heat.

Although this site was not completely excavated, the small quantity of ceramics it yielded deserve mention. Of a total of less than 600 sherds recovered, Late PII Anasazi types prevailed, with small quantities of both Emery and Snake Valley Gray also recovered. A relatively high frequency of Shinarump Red Ware to Tsegi Orange Ware (85%) suggests a post A.D. 1130 date.

42Ka543 Tewap Knoll

The simple architecture on this site consisted of a single “D” shaped masonry room partially lined with vertical slabs (Figure 166). The structure was constructed of from one to five courses of masonry resting on bedrock and was approximately 15 feet in diameter. Extending to the south was an “L” shaped course of sandstone blocks spaced 4 to 8 inches apart and measuring 17 feet on each side. Ceramics were late PII Anasazi with a trace of Emery Gray present. Layout, particularly the windbreak, is similar to field houses on the Paria Plateau (McFadden 2010). The sites location, complexity, and construction suggest its probable function was a seasonally occupied field house.

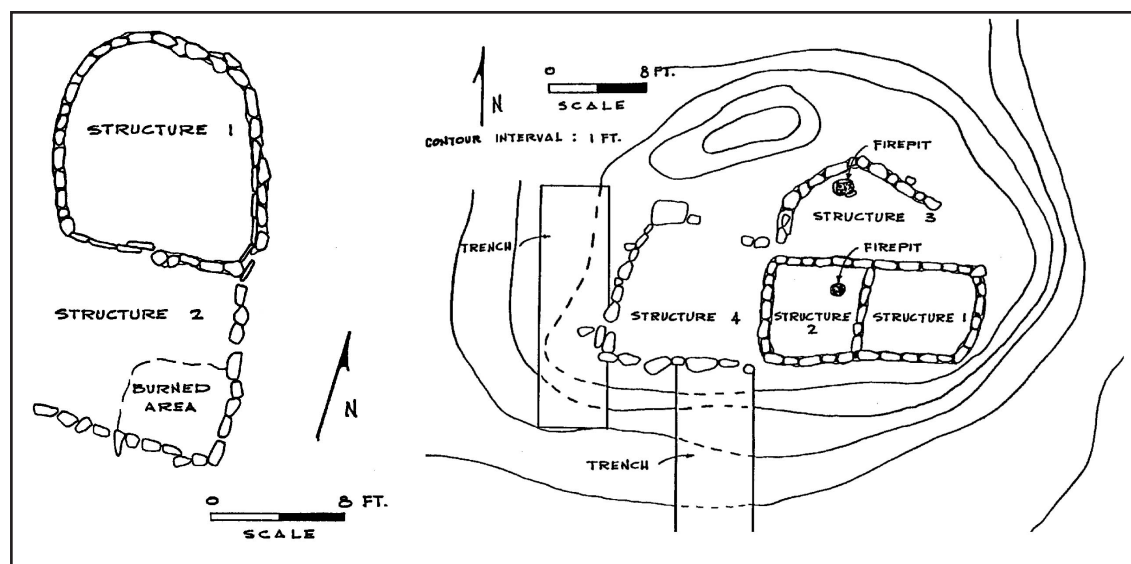


Figure 166. Small site architecture on Fiftymile Mountain: 42Ka543 (left), Tewap Knoll; (right) 42Ka346, Bridgette Site (Fowler & Aikens 1963).

42Ka346 Bridgette Site

The Bridgett site, said to be named, as several were, after the wrangler's mules, (C.M. Aikens personal communication 2012) consists of an east-west oriented block of two masonry rooms with alignments on the west and the north (Figure 166). Each room measured about 8ft x 7ft with wall remnants standing 2ft high. The east room (Structure 1) lacked floor features or evidence of an entry. The walls were built on a mantle of dirt overriding bedrock, the floor was an unprepared dirt surface.

Adjoining Structure 1 on the west, Structure 2 describes well as a residence thought to postdate structure 1. It displayed an off-center, circular firepit dug into bedrock and soot stained walls. Fill of both structures was similar. In general, it compares well with 42Ga3749 at the Lampstand cluster (see Figure 162).

Appended to the small roomblock on the west is a 15x15.5 foot enclosed use area defined by low masonry walls but open to the north suggested it served as a windbreak. Constructed against the north wall of the roomblock is an additional alignment of masonry 8.5 x 14feet with a large, unlined firepit.

Ceramics were dominated by late PII Anasazi types including both Tsegi Orange Ware (31) and Shinarump Red Ware (47). A significant number of Emery Gray sherds (37) and Snake Valley types (11) were recovered as well.

42Ka544 Sophia Cave

Although this is the only sheltered site excavated on the plateau, reconnaissance inventory suggests that sheltered camps similar to Sophia Cave are a significant site type on Fiftymile Mountain. Most of these shelters afford good natural protection, and typically have structural remains such as low walls and/or cleared areas against the back wall. This type of site is also the most common locus of rock art, usually consisting of faint red pictographs, on the plateau.

Sophia Cave is located under the rim of the Straight Cliffs overlooking the Escalante Desert to the east. Fowler and Aikens (1963) report excavation of a room formed by a low masonry wall and two slab-lined cists in the unpartitioned portion of the alcove. Fill was stratified with a thin black-stained sand on which the walls were laid. Above the sand were 2 to 24 inches of powdery brown sand that contained sherds bone, three grinding slabs, charcoal, and corn cob fragments.

The ceramic assemblage of roughly equal numbers of Emery Gray and late PII Anasazi sherds suggested to the excavators that the site may have been alternately occupied by both the Fremont and Anasazi. Given the setting of the cave and its probable specialized use, this possibility seems remote. A second possibility, one favored by Geib (1996) for similar multicomponent shelters in the Escalante drainage, is that the sherds are simply

“congeries” formed by mixing of an earlier Fremont occupation with a later Anasazi one. A third possibility is that the sherds are not mixed at all, but represent a single occupation by a group that used both Fremont and Anasazi ceramics.

42Ka354 Mudholes Pueblo

This site illustrates the wide range of architectural variation on the plateau. Similar structures with large rooms however are recorded to both the north (42Ka786) and the south (42Ka4456). The primary feature is a very large rectangular room measuring 21 x 30 feet with walls originally standing 15 courses high (Figure 167). In the center is a masonry pillar that would have been necessary to support such a wide roof span. Similar masonry pillars are known from alcove architectural sites on the plateau as well as on the Grand Staircase at the Corngrower site (Figure 94). A slab-lined hearth is located in the southwest quarter of the room. Adjoining the rectangular room on the southwest is a 7ft x12ft room whose walls are bonded to the larger structure. This appears to have originally extended 20 feet - or possibly longer. A low “J” shaped wall forming a light structure or windbreak appears to have been added late in the construction sequence. Similar to the other excavated sites on the plateau very little of the architecture seems to be devoted to storage.

West of the pueblo is a 34 inch diameter slab-lined firepit reminiscent of roasting pits common on

Fremont pithouse sites near Escalante (cf. Schaub P. 193). Also present was a mealing bin with a trough metate.

East of the pueblo 40 feet are two pitstructures; a shallow, 12 ft diameter slab-lined pithouse with firepit and a slab-lined depression 12” deep and just over 5 feet in diameter encircled with low masonry. Although the majority of ceramics from all portions of the site were Anasazi, a variety of Fremont ceramics were said to associate with the pitstructures.

42Ka368 The Observatory

This site consists of a large rectangular room and a unique circular pit structure (Figure 167). It represents the only case of superpositioned architecture encountered during the Fiftymile Mountain excavation project. The rectangular room measured 20ft x 25ft. Abutting it on the south was a smaller room, also with only a course or two of masonry which was partially covered by a circular rubble mound 32ft in diameter at the base, 18ft in diameter at the top, and 5ft high. It was apparent to the excavators that the rectangular masonry rooms had been dismantled in order to construct what appeared to be a pit structure in an artificial mound. The pit structure had no floor features. Its 6 to 8 inches of sandy floor fill contained only charcoal and sherds. The excavators believed the room had been deliberately filled.

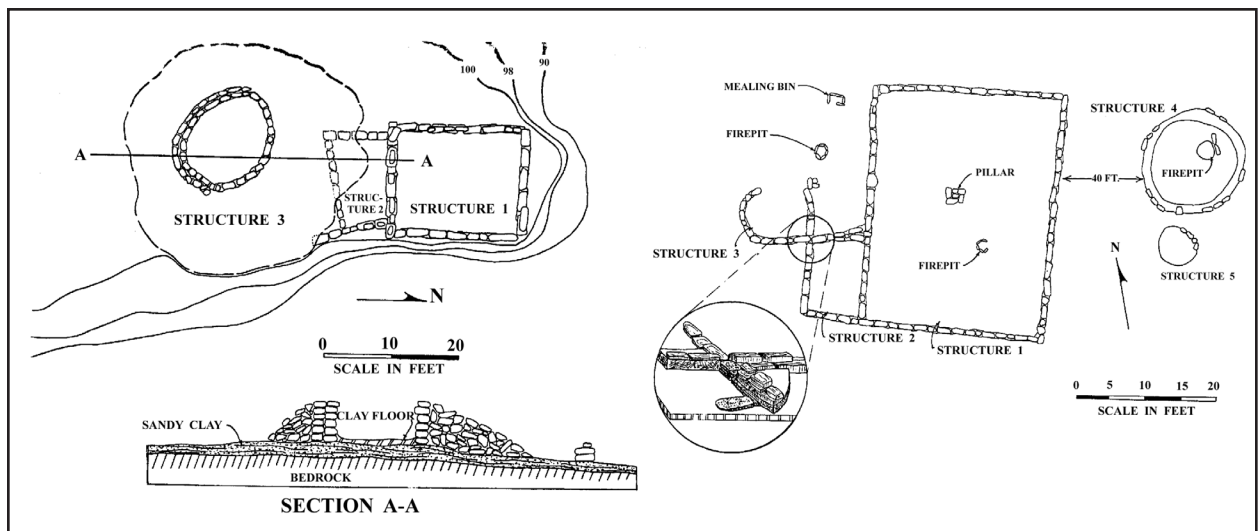


Figure 167. Unusual site plans, Fiftymile Mountain. (left) 42Ka368, The Observatory; (right) 42Ka354, Mudhole Pueblo. (after Fowler and Aikens 1963).

While no function for the structure was suggested, we might observe that the construction history on site involved disassembling a large, probably somewhat flimsy, structure in order to construct a smaller but very substantial one.

SELECTED BLM INVENTORIED SITES

42Ka4425 The Condo site

The Condo site is included here to document two vessels recovered from the site after a looting episode (Figure 168). The site occurs well below the rim of the Straight Cliffs on Fiftymile Mountain. Site documentation is based on photos taken from a helicopter which indicate a series of small masonry rooms, apparent granaries, situated on different levels of the cliff-face.

42Ka1944 Winter Quarters

The Winter Quarters site is a square masonry structure located on Fiftymile Bench at an elevation of 6,280 ft. The structure measures 4m x 4.2m and appears to be fully subterranean. Its substantial construction and non-agricultural setting suggest that it may have served as a winter residence. The apparent lack of storage facilities on site implies that it may be part of a larger seasonally mobile adaptive system involving separate locations for farming, storage, and residence. The structure was damaged by road construction in the 1960's and its condition has been monitored since 1976. Excavation was considered in 1999 as a mitigation proposal with excellent research potential but was not carried out.

Fiftymile Bench, at about 6,000 ft, occupies a narrow intermediate zone between the Escalante Desert and the top of Fiftymile Mountain about 1,000 feet above. As a marginal agricultural setting with both Fremont and Anasazi residential sites, Fiftymile Bench represents an opportunity to further explore the nature of early and late Formative settlement - as well as possible interaction between the Fremont and Anasazi. Apparent Fremont sites with late Anasazi sherds also occur on the bench.



Figure 168. 42Ka4425. Corrugated jars from the Condo site cf. Shinarump Gray Ware.

42Ga3728

This substantial storage site/field station is located in a northwest aspect rockshelter and is situated at the base of the Kaiparowits Plateau near the confluence of the Collet Canyons. The broad alluvial valleys of these major drainages provide local, if risky, opportunities for runoff farming. At 5,360 feet, 42Ka3728 is the lowest in elevation of several Late Formative storage sites within the Collet Canyon system. The highest is 42Ka4865 at

6,240 feet (see below). It is one of the few storage sites with artifacts, including a dozen or so small Moenkopi style corrugated sherds and two milling slabs. Constructed of masonry, the largest room measures 3m by 2m and could have served as a residence rather than for storage. Beam impressions in the wall indicate the roof sat about one meter above the present fill. A wall remnant on the west indicates that a smaller room with a common wall once adjoined the larger room. Six corn cobs were noted in it. Two storage cists, 1.5 and 2 meters in diameter are located on each end of the shelter.

Juniper timbers scattered among the rubble below the structures yielded three tree-ring dates; 0865-1149++vv, 0953-1156G, and 1031-1157+v indicating a building episode concurrent with both the Coombs site and construction activity on Fiftymile Mountain.

42Ka2580

This storage site is one of three dated in the Collet Canyon drainages (see 42Ka3728, 42Ka4865). Elevation of the site is 5,800 feet. It is located at the confluence of two significant drainages that have arable alluvial bottoms. The three granaries at 42Ka2580, along with a tiny (seed storage?) granary at nearby 42Ka4359, suggest the canyon was used over a considerable period of time - possibly during both the Early and Late Formative Periods.

All three structures are located in an accessible, shallow, south aspect rockshelter. Structure 1 on the north is the best preserved and presumably the latest. It is "D" shaped and backed up against the rear of the shelter. Construction is of non-dressed tabular sandstone and 50% mortar. The structure is relatively high volume and measures 1.6m long x 1m at its widest. Estimated wall height is 1.25m. The door opening measures 56cm x 35cm and is constructed with a sandstone sill, a wooden stick lintel and clay-coped doorjambs. While only two Moenkopi Gray sherds were found at the site, corn cobs were fairly abundant (ca.10). One corn cob selected from the fill yielded a 2 sigma radiocarbon date of Cal. A.D. 1005-1250 with intercepts at A.D. 1055, 1085 and 1150 (Beta-134477).

Two smaller granaries of similar construction occur a few meters to the west. Both are in very poor condition.

42Ka4865

This site consists of three masonry structures in a shallow south aspect shelter near the head of the Left Hand of Collet Canyon at an elevation of 6,240 feet. The largest structure is a "D" shaped room constructed of heavily mortared sandstone slabs built against the back wall of the shelter. It measures 2m deep by 2.7m wide with a maximum height of 1.7m. Ten small twigs protrude from the interior of the west wall. A radiocarbon sample taken from 50% of a 16cm long riparian twig yielded a radiocarbon date of 780+/-70 B.P. with a 2 sigma range of Cal A.D.1055-1085 and A.D.1150-1305 (Beta-132383). Large room size, aspect, and the presence of two small granaries suggests that the site functioned as a temporary residence, however, the lack of artifacts and cultural debris makes this interpretation problematic.

42Ka2683

This is a habitation site located in an accessible alcove within Lake Canyon. Three structures include a masonry subterranean pit structure with several large timbers spanning the walls, a dry-laid and mudded masonry surface room with a partition, and remnants of a small dry laid structure. Evidence for remodeling and substantial midden deposits indicate relatively long-term, or perhaps just intense, use of the site. Ceramics include Tsegi Orange Ware, Tusayan Black-on-Red, Moenkopi Corrugated, plain gray, and a vitrified plain sherd identified as Shinarump Brown.

A timber associated with the surface room collected in 1984 yielded a date of A.D. 1143g. Four additional timbers were collected in 1998. Non-cutting dates of: A.D. 1056vv, A.D. 1152++vv, A.D.1164vv and A.D. 1174vv indicate that the wood was procured A.D. 1150 -1180 (J. Dean, personal communication).

An eight row corn cob, found on the surface of fill in the square room was selected for radiocarbon dating because it offered the potential to date the terminal use of the site, rather than its construction. It yielded a 2 sigma radiocarbon date of A.D. 875-1040 with an intercept date of Cal A.D. 995 (Beta-132380). The date, over 100 years earlier than the tree-ring dates, apparently represents an earlier, undetected occupation possibly represented by the subterranean structure (see 42Ka1456 for a similar

situation). Given the relatively late tree-ring dates a review of the existing collection and additional field identification would be useful to determine if Shinarump Red Ware is present.

42Ka1625

42Ka1625 is a south aspect habitation site located under the rim on the west side of the plateau. Residential architecture includes two circular to oval, coursed masonry, surface structures about 5m in diameter - others are possible. Apparent storage remnants are located on a ledge above which is not accessible. Minor pictographs, bedrock milling slicks, hammerstones, a two-handed mano, chopper, and a small triangular projectile point occur on site. Notable among an otherwise typical late Pueblo II ceramic assemblage was the presence of a few Shinarump corrugated sherds. Of six tree-ring submissions, two non-cutting dates, A.D. 1120+vv and A.D. 1130 +vv, were obtained that are interpreted as having been felled sometime between "A.D.1130 and 1150"(J. Dean, personal communication 1998).

42Ka547

This sheltered storage site was recorded by Aikens during the 1961 field season (Fowler and Aikens 1963). The shelter is reported as holding five wet-laid masonry structures in good condition as well as the remnants of two others. Both circular and rectangular structures are represented - none contained firepits. The shelter is located on the west rim of the mesa near 42Ka1625. A single tree-ring specimen was collected by Aikens and dated 1189v (Bannister et al. 1969). This is the latest tree-ring date so far collected on the Kaiparowits Plateau.

Although well protected, the shelter is not well suited for occupation. Just below it, however, is a small sheltered camp, or possibly residential site, that may be associated with use of the alcove. The site was mapped by Donald Keller as part of a Four Corners School of Outdoor Education project (Figure 169). During a recent evaluation of the site an additional surface timber from the camp area was submitted for tree-ring dating but was found to be undatable (Appendix B).

Material collected or observed by the University of Utah included: Tusayan Corrugated, Tsegi Series

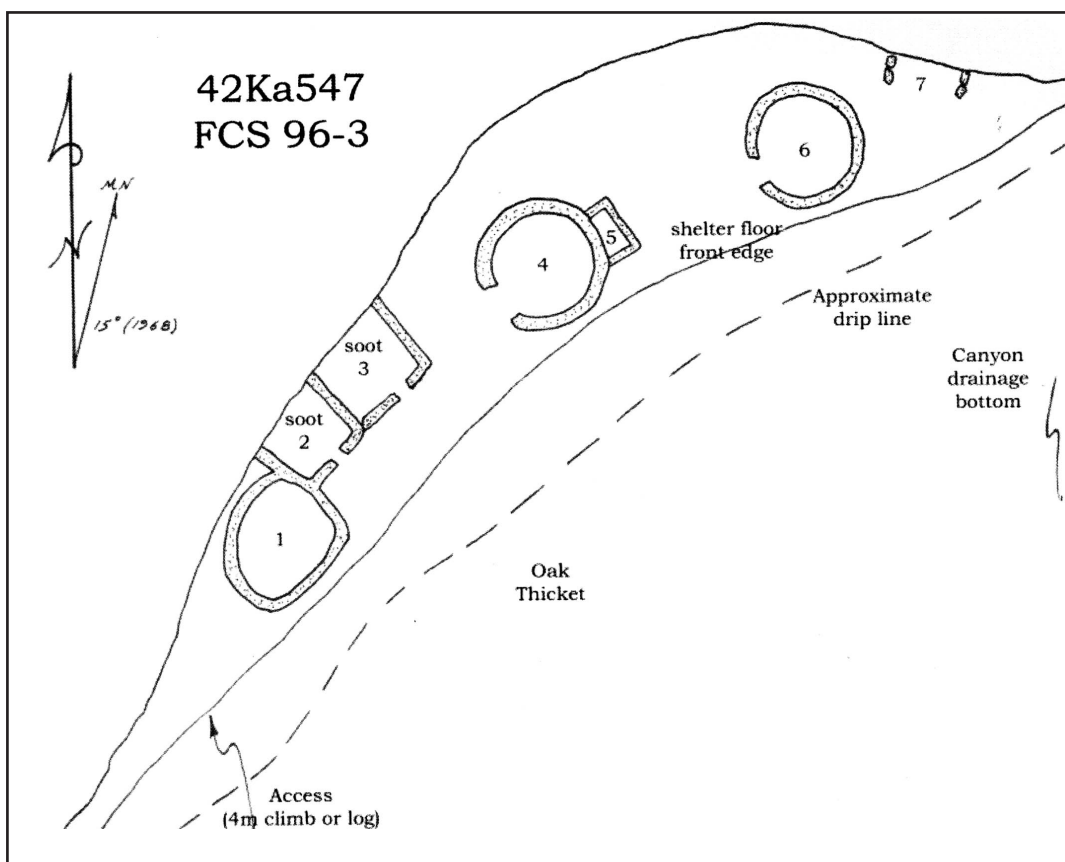


Figure 169. 42Ka547 plan map (provided by Donald Keller).

(12); Moenkopi Corrugated, Tsegi Series (11); Kiet Siel Gray (2); North Creek Gray, Virgin Series, fugitive red (1); Southern Utah Series Black-on-White (2), Turner Gray, Emery Variety (2). Chipped stone included 3 flakes and a blade fragment.

42Ka1456

This is a two room habitation site located in a tight, "U" shaped alcove with south aspect

overlooking Harveys Fear. The rooms are dry-laid masonry with mudded interiors (Figure 170). On the south is a free-standing room with walls over one meter high, but collapsed on the exposed side. The interior room was constructed later - its separate wall curves to avoid the outer room. Neither room has any obvious floor features, but they were probably used as residences nevertheless. A non-cutting date of 980vv was obtained from a timber found in the outer room. Artifacts on site

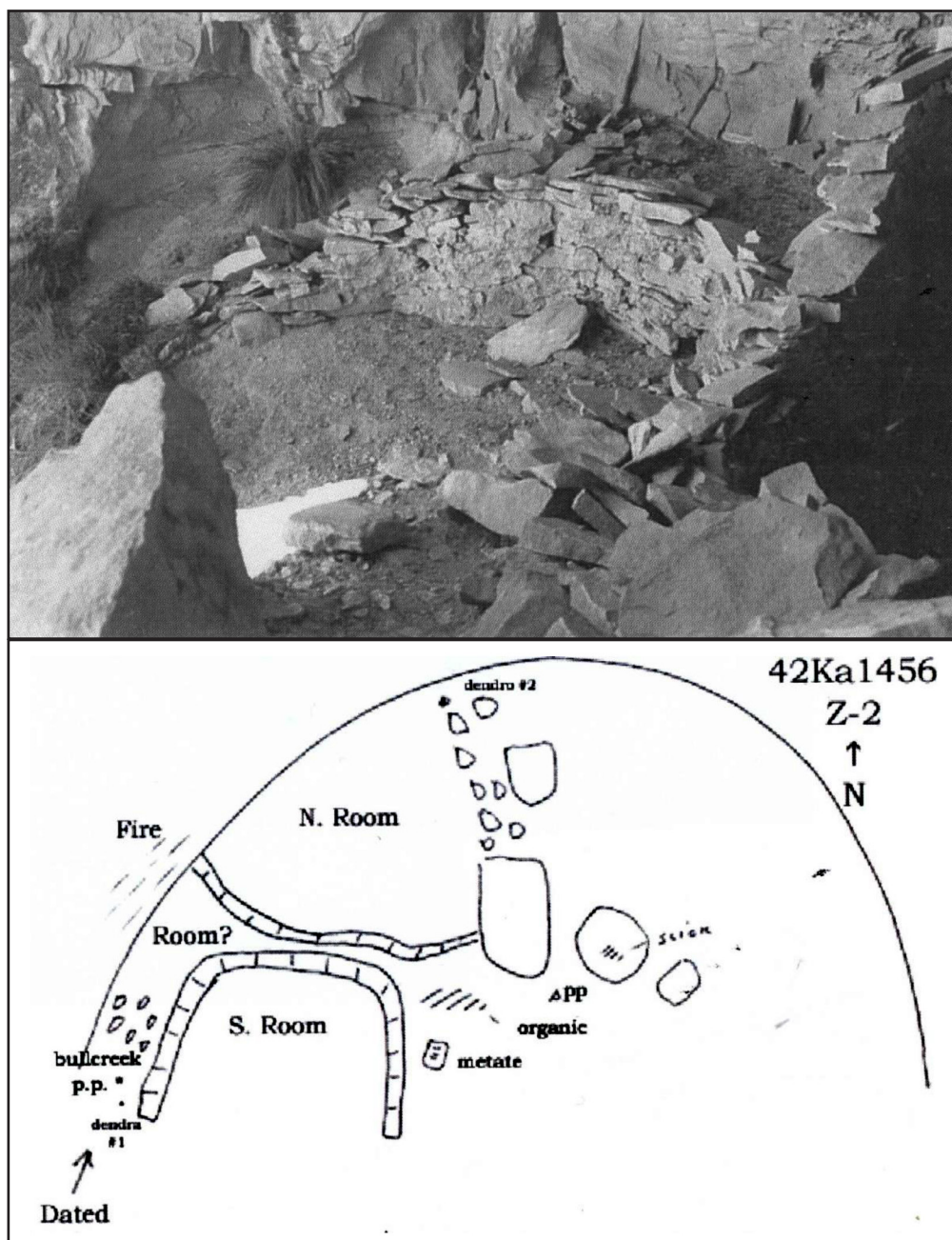


Figure 170.42Ka1456, photo and sketch map.

include: two Bull Creek points, a trough metate, a basin milling stone, a hammerstone and a dozen corrugated sherds. The site seems typical of the substantial masonry dwellings that lack storage and are found in accessible, south aspect locations suitable for winter residence.

42Ka4416 Arch Granary

This site yielded a 2 sigma date of A.D.780-1020 and is described in the Early Formative section as a probable Fremont site (see Figure 116). A single Moenkopi Corrugated sherd indicates possible reuse during the late Formative period.

42Ka1248 Double Granary

This is a unique two-story granary located in an accessible setting just under the rim of a canyon near Collet Top (Figure 171). The masonry structure was built as a single unit with an interior floor/ceiling constructed of juniper poles. Masonry is of selected flat sandstone with about 50% mortar. A 35cm high juniper log partition divides the lower room into two cribs. The interior of the upper room is 2m in diameter and 70cm high; the lower room

measures 2 x 2.75m and is 110cm high. The entries are similar; slightly offset, they are oriented to the south and both have lintels (door stops) made of three small sticks. The upper door measures 50cm x 40cm, the lower 55 x 45cm. Bark from the ceiling of the lower room yielded a 2 sigma radiocarbon date of A.D. 995-1300 (Beta-134475). The intercept was A.D. 1195; however the flat curve of the calibrated calendar time scale during this period makes a mid-1000's date an almost equal probability.

A second badly deteriorated granary is located a few meters to the southeast. Artifacts on site include a few Moenkopi style corrugated sherds. No residential structures are known from the immediate area. Because the canyon bottom appears to be unsuitable for agriculture, dry farming on the mesa-top is probable.

42Ka4876

This is a masonry granary and associated camp located about midway between the rim of the Straight Cliffs and Fiftymile Bench (Figure 172). At 500 ft below the rim, access is difficult from both above and below. A cleared use area is located nearby with ground stone and several corrugated vessels. Camps

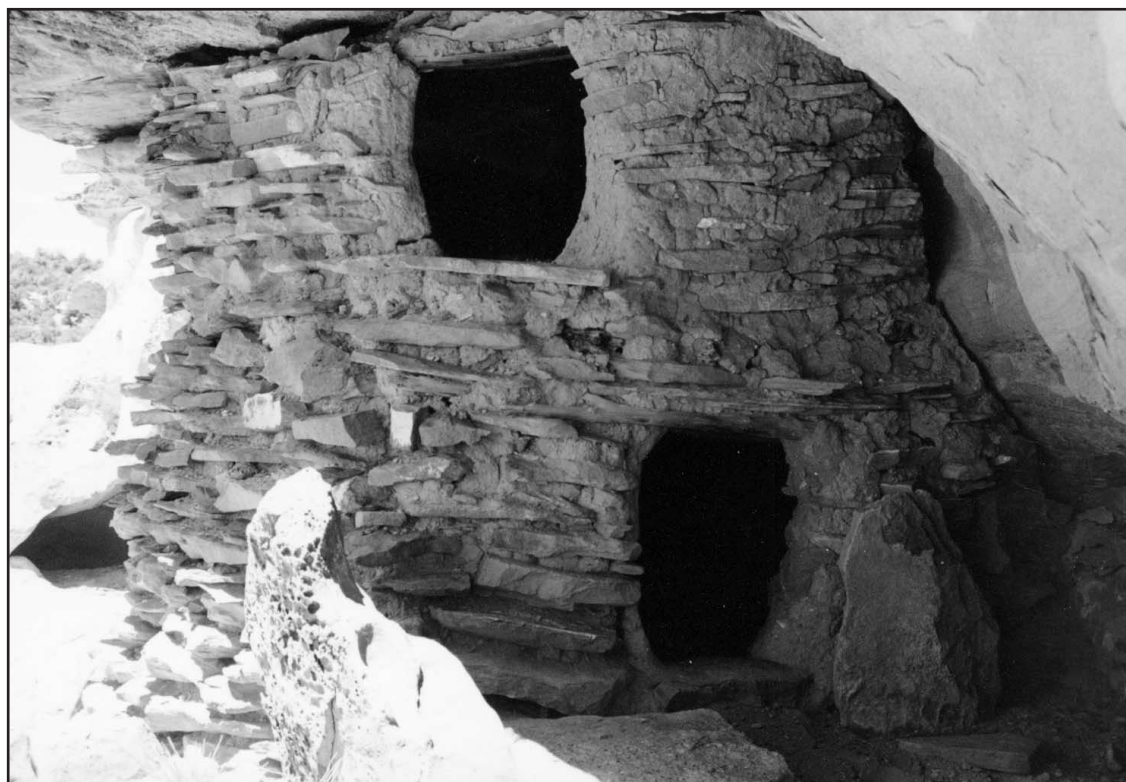


Figure 171.42Ka1248, Double Granary; Collet Top locality.

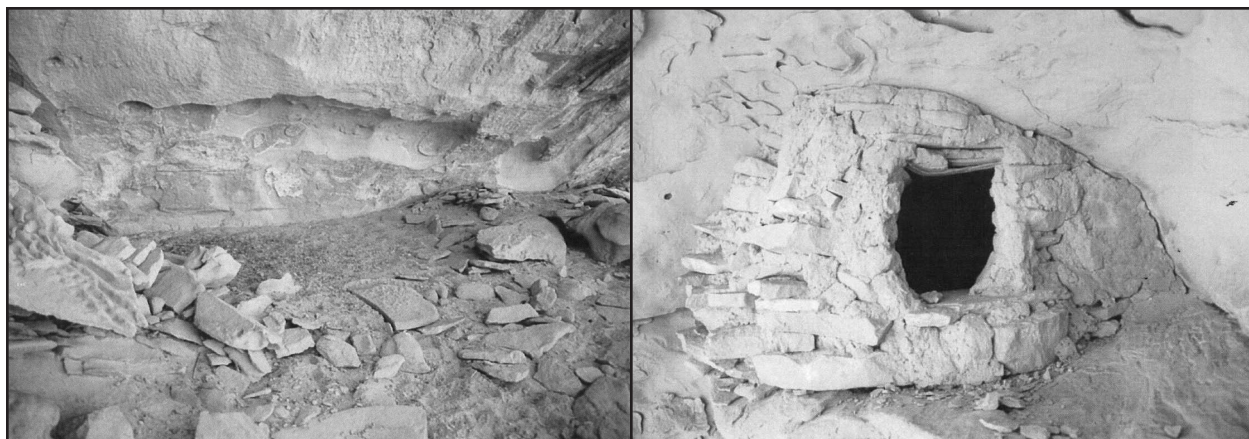


Figure 172. 42Ka4876 use area (left); granary (right).

such as this are relatively common on Fifty mile Mountain although associated granaries are not. Occasionally these sites occur with cached vessels hidden in inaccessible overhangs. A radiocarbon date from a corn cob fragment yielded a 2 sigma range of A.D. 1035 - 1250 (Beta-134479).

42Ka3383 Olla Alcove

This is a residential site that forms part of a cluster of granaries, open structural sites, sheltered camps, and residences on Spencer Point. The main feature on site is the remnant of a burned, oval masonry room about 4 meters across. Behind the room is a short wall segment enclosing a little niche against the back of the shelter where an olla was recovered (Figure 173). The olla is a large Moenkopi corrugated style that had been cracked and sealed with pitch. A wash of red ochre was then applied to the patch and surrounding area. The vessel was collected in 1988 when the site was initially recorded. The pitch offers a unique opportunity to directly date the vessel.

Against the back wall in the southwest corner of the alcove are the remnants of two parallel walls that formed a second room or possibly just a shelter. The alcove has no obvious storage rooms.

Two corn cobs were collected for radiocarbon dating in 1999, one from each end of the alcove. A 10 row cob from the south end yielded a 2 sigma calibrated date of A.D. 1005-1270 (Beta-132381). A 14 row cob from the packrat midden that covered the vessel on the north end yielded a Cal A.D. 995-1195 date (Beta-132382).

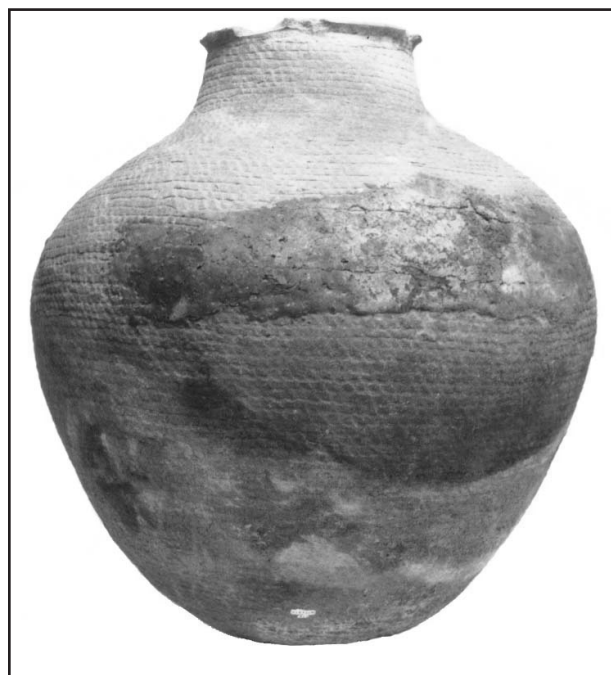


Figure 173. Corrugated olla (cf. Virgin series) from 42Ka3383 (approximately 45 cm. high), note ochre stained pitch used to patch crack (on display at the GSENM Kanab Visitor Center).

42Ka4450 Log House, 42Ka1457 Fire House

These two similar structural sites are located in a well-protected, south aspect alcoves at over 6,700 feet overlooking Harveys Fear (Figure 174). Log House consists of two separate rooms, each about 5 m. wide, constructed against the back wall of the alcove. The eastern structure is 5m wide by 4.20m deep and incorporates pinyon logs mortared into its masonry walls. Set upright against the back wall of the shelter are roof support posts 120cm high.

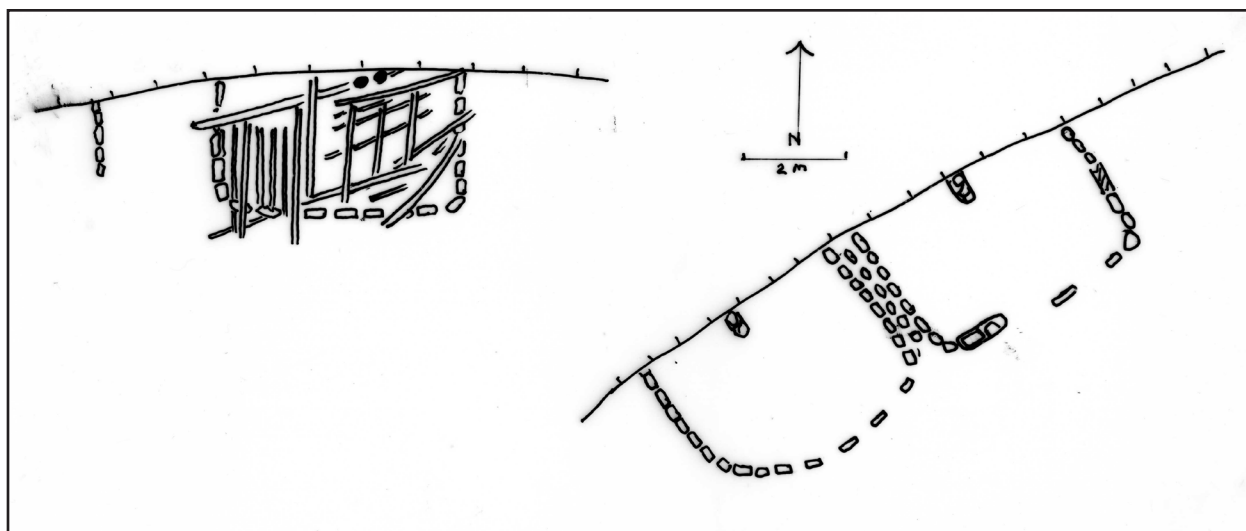


Figure 174. 42Ka4450, Log House, and 42Ka1457 Fire House, structure plans.

Additional masonry wall remnants or anticipated structures abut the back wall of the shelter.

Firehouse (so named because it had burned) consists of two separately constructed, abutting rooms measuring 4m x 3.55m and 5m x 4.6 m (Figure 174). The west and east oriented rooms each have a centrally located masonry pillar, 1.25 m and 1.5 m high respectively. A 50cm wide entry is located on the east side of the easterly room.

Log House and Fire House have different methods of wall construction but are similar in size, layout, and setting. Pottery is not abundant at either but they are both apparently about the same age and probably functioned as residences (Figure 175). They are some distance from arable fields suggesting use was primarily during the winter.

Five pinyon specimens collected from Log House were submitted to the Laboratory of Tree-ring Research in 1998 but were not datable due to erratic growth patterns. The logs built into the east wall are probably suitable for coring but may have been dead and down when acquired.

42Ka554/6941

This site was initially reported by Aikens as part of the Fiftymile Mountain survey conducted in 1961 (Fowler and Aikens 1963). It was recorded in detail by M. Zweifel in 2012 and subsequently radiocarbon dated. It is an excellent example of well-secured, potentially defensible, storage granaries along the Straight Cliffs (Figure 176). Six granaries of various sizes but similar masonry construction

are described. Access/entryways are the sealed, intermittent access type. Roofing techniques are similar to those described at 42Ka1694 (Figure 62) an early PII granary above Parunuweap Canyon.

Zweifel describes the basis for at least a partial construction history for the site based on abutted walls, the apparent deconstruction of two structures, replastering episodes, and the placement of corn cobs in the mortar - a practice observed at a much earlier Fremont site (42Ka4416) a few miles to the north.

Granary 1, the largest is 3.5m x 2.55m and about 1.4m high, providing a capacity of over 12 cubic meters. It is built against the cliff face with the roof still intact. Granary 2 was an earlier structure that was apparently disassembled and used in another structure. Granary 3 is a large bathtub shaped structure built against a large roof fall boulder. A portion of the roof closing material was intact and dated. Interior measurements are 3 x 1.4 meters with a roof height of 1.15 meters providing a volume of about 5 cubic meters. Entry was through the roof. Granary 4 is intact and was built against the rear wall of the shelter and a boulder. Zweifel estimates the volume to be close to 3 cubic meters. Granary 5 was a remnant, apparently dismantled, and abutting granary number 6.

Overall storage capacity of intact granaries 1, 3, and 4 provide a (minimal) combined storage capacity of 20 cubic meters. Table 28 provides storage capacities for residential sites on the Grand Staircase. The capacity of these individual units during Late Pueblo II average about 5 or 6 cubic

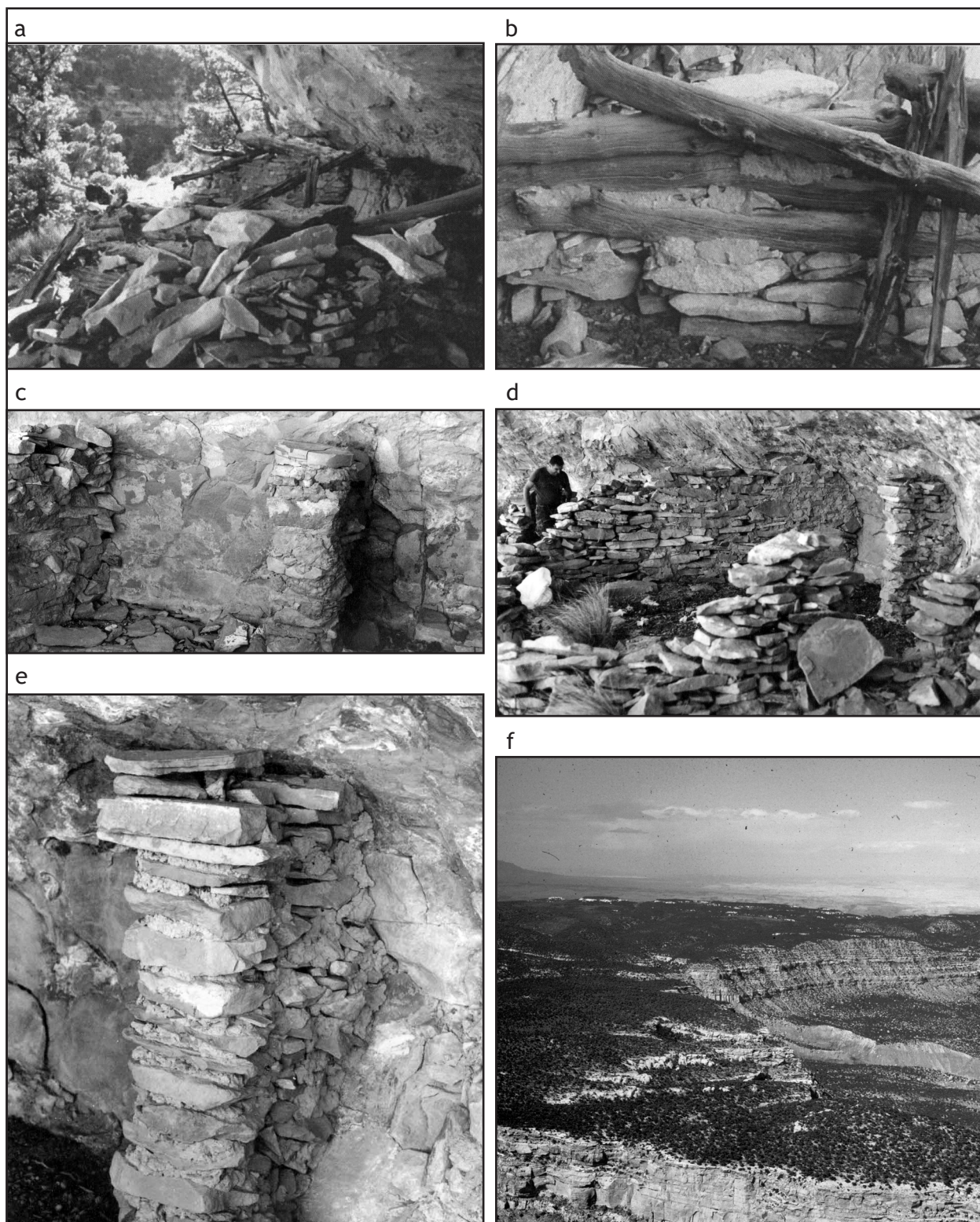


Figure 175. 42Ka4450 Log House a) overview to west, b) detail of composite construction; 42Ka1457, Fire House c) overview of west room, d) overview of east room, e) detail of east room pillar; f) Harveys Fear with Spencer Point in foreground, view to north (photo by Larry Royer).

meters. The storage capacity at 42Ka554/6941 exceeds the annual requirements of a family of five (@ 3 cubic meters unshelled) by over six fold. This suggests that the site may have served a group of around 30 individuals on an annual basis. Alternatively, the granaries could have held surplus for a smaller group for several years. It seems likely, however, that the volume available would represent the most bountiful harvest, rather than average ones, reducing the groups size even more.

Apparent, but obscure pictographs in the ubiquitous red ocher pigment were noted on the wall. There is no indication that the site was used as a residence. Artifacts are minimal, as is the case on virtually all granary sites. Zweifel reports an apparent trough metate, possibly a curated tool but more likely used on-site to process small amount of maize. Present were two sherds, one Shinarump Corrugated and a plain gray sherd. A quantity of maize cobs remains on site.

Aikens' description of the site is in accord with Zweifel's but includes under "materials collected or observed": chipped stone (4); grinding slab (1);

Tusayan Corrugated, Tsegi Series (11); Tusayan Corrugated, Coombs Variety (3); Moenkopi Corrugated, Tsegi Series (6), Kiet Siel Gray (2), North Creek Corrugated, Virgin Series (4), and Southern Utah Variety Black-on-Gray (1). As regards the narrow ledge on the north Aikens remarked that there was a wall "presumably designed to control traffic pattern." As mentioned elsewhere, the access for many of the Anasazi granaries on Fiftymile Mountain is remarkably difficult suggesting defensive measures or concealment were important.

A series of the three radiocarbon dates taken on twigs from structures 1, 3, and 4. FS1 was Cal A.D. 1040-1110 and Cal A.D.1120 to 1220 with an intercept date of A.D.1160 (Beta -358240). FS-2 yielded multiple intervals ranging between A.D.1050 and 1250 but also three intercepts of Cal A.D.1190,1200 and 1210 (Beta-358241). FS 3 was dated Cal A.D. 1030 to 1220 with a Cal intercept of A.D. 1160 (Beta-358242). Averaged, the dates offer a plausible construction/use date during the period A.D. 1160-1200.



Figure 176.42Ka554/6941, aerial view of granaries.

VIRGIN / KAYENTA CHRONOLOGY IN THE UPPER ESCALANTE AND KAIPAROWITS REGION

Existing Chronologies

Based on fieldwork conducted by the Glen Canyon Project, five phases of prehistoric occupation (Table 40) have been recognized for the Kayenta occupation of the Red Rock Plateau (Lipe 1970:87).

The Red Rock Plateau chronology is “based on the seriation and correlation of Red Rock ceramic complexes with assemblages outside the area for which tree-ring dates are available” (Lipe and Lindsey 1983). The authors point out that “Much of Lipe’s argument for a period of light occupation or abandonment between the Klethla and Horsefly Hollow phases rests on the scarcity of Flagstaff Black-on-white in the Red Rock Plateau, and its relative abundance in both highland and lowland sites just south of the San Juan” (Lipe and Lindsey 1983). Apparently there are still no tree-ring and few radiocarbon dates available to support a local sequence. An exception is a single radiocarbon date reported by Geib (1996) from the Alvey Site: Cal. A.D. 1032 with a 2 sigma range A.D. 885-1279 (Beta-34943). He notes that Pueblo II sites of this period are generally camps rather than architectural (Geib 1996; 180). The relevance of the Red Rock Plateau sequence for this study is simply its proximity to the Kaiparowits Plateau and the observation that, given present dates, the most intense occupation of the Kaiparowits occurred during the occupational hiatus of A.D.1150-1210 on the Red Rock Plateau (see Figure 154).

Ambler (1985) provides a detailed chronology based on the seriation of pottery types from the Navajo Mountain area, adjacent to Fiftymile Mountain. If we assume the Kayenta “expansion” onto the Kaiparowits Plateau originated from

the Tsegi Canyon region of northern Arizona, as did Aikens and Fowler (1963), Ambler’s Navajo Mountain based chronology would seem to be the most appropriate for Fiftymile Mountain. The Navajo Mountain chronology also fits the Grand Staircase ceramic sequence quite closely; this at least allows for the possibility that the “Pueblo II expansion”, to both the Kaiparowits Plateau and the Grand Staircase, could have originated in the same region of northern Arizona.

Ambler dates the Klethla Phase as A.D. 1090-1170 and defines its ceramic assemblage as including: (TWW) Sosi Black-on-White 40-60%, Dogoszhi Black-on-White 30-50%, Black Mesa 0-30%, and Flagstaff Black-on-White 0-30%; (TOW) Tusayan Black-on-Red 50-90%, Citadel and Tusayan Polychrome 0-50%; Medicine Black-on-Red 0-10%; (TGW) Tusayan Corrugated 40-90% and Moenkopi Corrugated 5-60%. These types also define the Late Pueblo II in the Virgin culture area and seem to characterize the Fiftymile Mountain assemblage quite well (Ambler 1985). During the succeeding Dził Nez Phase, A.D.1170-1210, type frequencies change and only Medicine Black-on-Red drops out entirely. It is not until the Shonto Phase, A.D.1210-1255 that the readily identifiable late types appear: Tusayan Black-on-White, Tsegi Orange, and Kiet Siel Gray.

Kaiparowits Plateau Tree-ring Dates

Tree-ring dates from the Kaiparowits Plateau range from A.D. 980v to A.D.1189v (Table 41). The majority of dates, however, occur during the 2nd half of the 12th century and even those from the first half are interpreted as having been “felled sometime between A.D.1130 and 1150” (Jeffrey

Phase	Estimated date	Pecos Period
<i>White Dog</i>	<i>A.D. 200-300</i>	<i>Basketmaker II</i>
-	<i>depopulated</i>	<i>BMIII-PI</i>
<i>Klethla</i>	<i>A.D.1100-1150</i>	<i>Pueblo II</i>
<i>Horsefly Hollow</i>	<i>A.D.1210-1260</i>	<i>Pueblo III</i>
<i>Jedditi & Sikyaki</i>	<i>A.D.1300-1600</i>	<i>Pueblo IV</i>

Table 40. Red Rock Plateau phases (after Lipe 1970:87).

Dean personal communication 1998). The single date prior to A.D.1000 could be from a Fremont component or simply “old wood.” Present tree-ring data suggest the occupation of Fiftymile Mountain was largely restricted to the second half of the 12th Century. Lipes (1970) Kletthla and Horsefly Hollow phases on the Red Rock Plateau, occur prior to, and after, this period (Figure 97). It is also worth noting that the tree-ring dates from the Coombs site (Table 38) are coeval with those from the Kaiparowits Plateau.

Fiftymile Mountain Radiocarbon Dates

At the outset it must be stated that the critical period for assessing Fiftymile Mountain settlement history A.D.1100-1200 coincides with an unfortunate and frustrating gap in the precision for radiocarbon dating record. Consequently, matching tree-dated residential structures with radiocarbon dated granaries in order to consider settlement patterns is a less than ideal situation.

In a general way, however, radiocarbon dates from Fiftymile Mountain correspond well with tree-ring dates (Figures 177, 178). Dates reported here are from seven late PII sites located in two separate

clusters; the Collet Top area (42Ka4865,42Ka1248, and 42Ka2580) and those on the plateau southeast of Basin Canyon (42Ka4876,42Ka3383,42Ka2683 and 42Ka6941) (Table 42). There appears to be little difference in the span of occupation for the two areas, although this perception could easily change with future investigations.

The site types dated include a sheltered camp (1), granaries (3), and sheltered residential sites (3). No obvious temporal trends are apparent other than at the residential site 42Ka2683. There, a relative early date on a corn cob with a calibrated midpoint of A.D. 995 (Beta-132380) may suggest an undetected Wide Hollow Phase occupation.

As regards radiocarbon dating granaries, arguably these well-constructed, sturdy structures represent the greatest investment of resources, time, and labor than any structure type on the plateau. The near useable condition of many today, some 800 years after their construction, indicates their prehistoric use may have continued for several generations. The implication then is, as imprecise as radiocarbon dates are during this era, wood and bark dates should be considered construction dates (recognizing many sites have sequentially constructed units) and maize dates might represent any time between initial

Site	Date	Locality	Collector
42Ka547	1050-1189v	Fiftymile Mt.	C.M. Aikens
42Ka3728	0865-1149++vv	Collet Canyon	BLM
42Ka3728	0953-1156g	Collet Canyon	BLM
42Ka3728	1031-1157+v	Collet Canyon	BLM
42Ka2683	0960-1143g	Fiftymile Mt.	BLM
42Ka2683	0979-1056vv	Fiftymile Mt.	BLM
42Ka2683	0842-1152++vv	Fiftymile Mt.	BLM
42Ka2683	1010-1164vv	Fiftymile Mt.	BLM
42Ka2683	1078-1174vv	Fiftymile Mt.	BLM
42Ka1625	0991-1120+vv	Fiftymile Mt.	BLM
42Ka1625	0955-1130+vv	Fiftymile Mt.	BLM
42Ka1456	0792p-980vv	Fiftymile Mt.	BLM
42Ga4983	-1083++vv	Circle Cliffs	R. Talbot

Table 41. Tree-ring dates (Anasazi) from Fiftymile Mountain and Circle Cliffs.

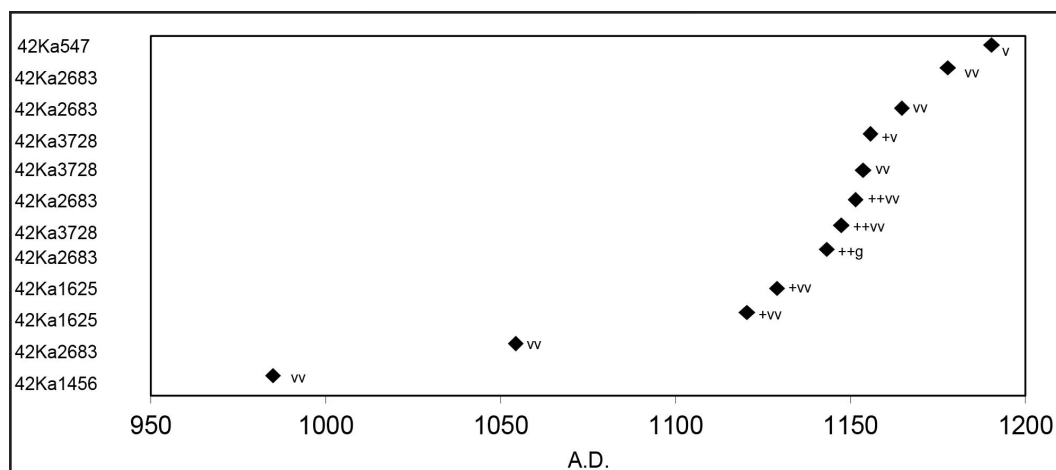


Figure 177. Tree Ring Dates from Fiftymile Mountain: 42Ka1456, probable “old wood”; 42Ka2683 “procured A.D. 1150-1180” (Jeffrey Dean, personal communication); 42Ka1625 - “felled sometime between A.D. 1130 and 1150” (Jeffrey Dean, personal communication 1998); 42Ga3728 a tight cluster during mid A.D. 1150’s; 42Ka547, collected by C.M. Aikens

construction and abandonment but should provide a minimum terminal date. A thorough account of granary construction and use history would benefit from using both dating methods.

In some contexts, if a maximum age for a well-associated ceramic type has been established, a significant amount of precision over the radiocarbon span might be achieved. The presence of Shinarump Red Ware may be a useful horizon marker in that regard (see Appendix D).

Fiftymile Mountain Ceramic Assemblage

Ceramic cross-dating suggested a range of A.D. 1050-1250 for the entire right bank of the Colorado River to early investigators (Aikens and Fowler 1963; Lister 1964) - although they believed the actual period of occupation was probably much shorter. Since then, our knowledge of the distribution and chronology of both Kayentan and Virgin ceramics has advanced significantly. Based on type frequencies as well as cross-dating, there is the potential to work out a temporally sensitive sequence. At this point, however, several assumptions are involved.

If we assume that the Fiftymile Mountain Anasazi assemblage was coeval with the Fremont type Emery Gray, two main temporally sensitive assemblages can be identified: 1) Emery Gray (and reportedly Snake Valley Gray sometimes associated with plain sand-tempered sherds) identify the Wide Hollow Phase. Small amounts of Late PII white

and red ware suggest a post A.D. 1050 date. 2) the Fiftymile Mt. Phase is characterized by Virgin and/or Shinarump series white wares, corrugated gray ware, and Tsegi Orange Ware. Potentially this assemblage predates A.D. 1100; when accompanied Shinarump Red Ware (usually in addition to Tsegi Orange) a post A.D. 1130 date is suggested; as the frequency of SRW increases to 90% or higher, a post A.D. 1150 date becomes more likely.

Corrugated percentages of utility ware on the Grand Staircase may be as high as 70% by A.D.1100 over 80% after A.D.1150. On Fiftymile Mountain corrugated percentages on the excavated sites average 77% if Kiet Siel plain gray is included (Fowler and Aikens 1963). The Kayenta PIII type Kiet Siel gray identifications seem unlikely given both their Kayenta cultural affiliation and their late temporal implications. It is possible, if not probable, that both corrugated and plain gray utility vessels were made locally in a “Virgin tradition” leaving white and red wares as the primary imported pottery.

It might be expected that the frequency of Emery Gray would decrease over time - it seems not to; it is present in small numbers on many different site types on the plateau - even in assemblages with higher percentages of Shinarump Red Ware (see Appendix E). If this is taken as a comment on Fremont - Anasazi interaction, it might be argued that the presence of Emery Gray indicates a relatively stable relationship throughout the Fiftymile Phase. Based on the overall ceramic assemblage then, the Anasazi occupation of Fiftymile began after

A.D. 1130 and may have only lasted until about A.D.1200. Only a single sherd of fine, “mosquito net” Black-on-White from 42Ka5961on Spencer Point suggests a Pueblo III presence.

As regards local production of Virgin “tradition” utility vessels on Fiftymile Mountain, clays originating in the Cretaceous formation deposits might be suitable. Petrographic analysis might resolve some of the confusion about sources. Existing collections of curated sherds and several complete vessels are available for future analysis.

**Fiftymile Mountain Phase,
A.D. 1100/1150 - 1200**

Lister (1964:68) believed that the major Puebloan occupation - not merely of the Kaiparowits, but of the entire area covered by the

extensive Right Bank survey (Fowler et al. 1959; 1958) - extended over a period of scarcely 150 years. Even this relatively brief period could be too long. Existing tree-ring dates suggest an initial date of A.D.1150 or a little earlier for the introduction of Anasazi material culture traits on the Kaiparowits Plateau. The most recent tree-ring date of A.D.1189v (Figure 177) suggests a terminal date as early as A.D.1200 which is supported by the absence of distinctive Pueblo III white wares on the plateau. The existing radiocarbon dates (Figure 178) are congruent with this interpretation but allow for a post A.D. 1200 occupation.

Summarizing the Glen Canyon material, Geib suggests that a useful definition of the Pueblo II period for Glen Canyon is from about A.D. 1050 to A.D. 1150. He describes the period as “...few Pueblo II sites of the Glen Canyon lowlands exhibit

Site #	Laboratory Number	C 13/12	Material	BP age (Conv.)	2 Sigma Cal Range	Cal. Curve
42Ka2683	Beta -132380	-9.8	Corn cob	1060+/-60	AD 875-1040	AD 995
42Ka3383	Beta -132381	-9.4	Corn cob	900+/-70	AD 1005-1270	AD 1160
42Ka3383	Beta -132382	-10.3	Corn cob	960+/-50	AD 995-1195	AD 1035
42Ka4865	Beta -132383	-23.8	Twig	780+/-70	AD 1055-1085 AD 1150-1305	AD 1260
42Ka1248	Beta -134475	-21.1	Shredded Bark	860+/-100	AD 995-1300	AD 1195
42Ka2580	Beta -134477	-9.8	Corn cob	920+/-60	AD 1005-1250	AD 1055, 1085, 1150
42Ka4876	Beta-134479	-13.6	Corn cob	880+/-40	AD 1035-1250	AD 1175
42Ka6941	Beta-358240	-22.3	wood	890+/-30	AD 1040-1110 AD 1120-1220	AD 1160
42Ka6941	Beta-358241	-24.1	wood	860+/-30	Multiple AD 1050-1250	AD 1190 AD 1200 AD 1210
42Ka6941	Beta-358242	-25.3	wood	900+/-30	AD 1030-1220	AD 1160

Table 42. Anasazi radiocarbon dates from Fiftymile Mountain.

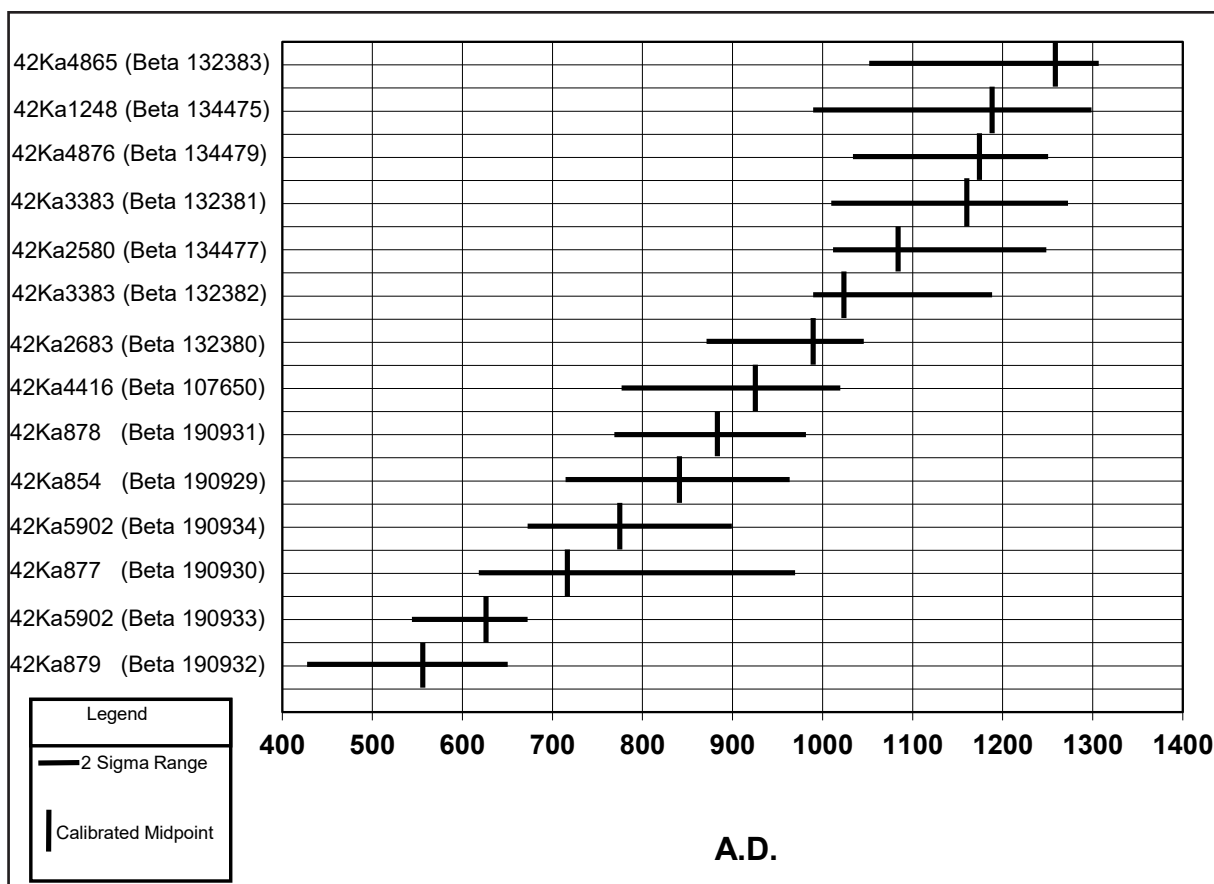


Figure 178. An array of radiocarbon dates from Fiftymile Mountain (Wide Hollow and Fiftymile Mountain Phase) from Tables 35, 36 and 41

characteristics indicative of year-round occupation, and most archaeologists have characterized them as temporary camps. This is in marked contrast to Pueblo III sites, which often include middens, and ceremonial structures (see Lipe 1967, 1970). A.D. 1150 is also a useful dividing point because it marks the start of an approximately fifty-year period when the Anasazi either entirely or nearly abandoned the Glen Canyon lowlands" (Lipe 1970:113-14,122) Geib 1996:180). The tree-ring dated construction activity on Fiftymile Mountain, at almost precisely that time, is an interesting coincidence that may or may not be evidence of population movement.

Ambler's initial date of A.D.1090 for the Klethla Phase in the Northern Kayenta area fits the Grand Staircase chronology reasonably well. A tree-ring dated construction event occurred in the Kanab area by A.D. 1100 (see Figure114). Tree-ring dates from Fiftymile Mountain and the Coombs site begin a few decades later (see Table 38) suggesting that the PII expansion may not have been simultaneous event.

A.D.1050 is the date generally cited as the beginning of Anasazi spread into the Escalante drainage. If anything it may be too early - at least for significant population movement. This date is based on a single radiocarbon date from maize collected from the upper level for the Alvey site (Geib 1996). As Geib (1996) pointed out and Keller (1999) has recently confirmed, Anasazi habitation sites in the tributaries of the upper Escalante River are rare to non-existent during late Pueblo II times. In contrast, the Kaiparowits Plateau, Boulder Valley, and to some degree the Circle Cliffs, provided extensive arable uplands that permitted sizable groups to live in relatively close proximity. Apart from the basic adaptive requirements of agriculture, the Anasazi sought out areas where dispersed farmstead communities could exist (Geib 1996; McFadden 1996).

The suggestion of a new phase name for the Pueblo II occupation on Fiftymile Mountain (rather than Klethla) is based on the following reasoning: 1) There is no evidence to demonstrate that the northern

Arizona and Fiftymile Mountain occupations are entirely coeval - very likely the Fiftymile occupation is shorter; 2) It now seems likely that the migration to Fiftymile originated not in northern Arizona but on the Grand Staircase/eastern Arizona Strip; 3) The site types, architecture, and settlement pattern on Fiftymile are distinctive and are unlike any in the region. Artifact and ceramic styles are the only real connection with northern Arizona. Technical differences between northern Arizona types and those found on Fiftymile Mountain are considerable and may be due to local production, or as Geib et al. (2001) has suggested, are actually Virgin imports.

Pueblo II Expansion on the Monument

Some have argued that the region east of Kanab Creek was always Kayentan, so the concept of a Pueblo II expansion from the Kayenta culture area onto the Monument has little meaning (Euler 1994). Aikens (1966) argued for "in situ" growth for the Virgin (1966; 56) although he doesn't explain the mechanism for the introduction of Kayenta traits, his position is well-taken and supported by more recent data. In situ growth does however seem to contradict his and Fowler's (1963) earlier interpretation of the Fiftymile Mountain occupation as resulting from a direct migration of Kayenta peoples moving out of the Tsegi Canyon area. Today, most researchers accept the notion of a close but poorly understood, possibly quite variable, Virgin-Kayenta relationship on the eastern Arizona Strip and Grand Staircase and specifically on the Kaiparowits Plateau, Paria Plateau, House Rock Valley, the inner Grand Canyon, and Walhalla Glades by A.D.1050 (Mueller 1974; Schwartz et al. 1981; Lyneis 1996).

A legitimate culture-historical issue, with considerable implications for culture process, worth pursuing on the Monument is whether the "Pueblo II expansion" occurred in both the Kaiparowits Plateau/Escalante drainage and the Grand Staircase simultaneously or sequentially. Dates from both the Grand Staircase and Fiftymile Mountain suggest a reasonably close, but not identical date for the onset of the Late Pueblo II Phase in the Virgin culture area and the Fiftymile Mountain Phase to the east (see Figures 119,178). This is not idle concern with historical minutia but a chronological issue that bears directly on the question of local adaptation: That is, did Kayenta peoples migrate to the Grand

Staircase, with its existing Virgin population, at the same time that related groups moved onto Fiftymile Mountain, with its indigenous Fremont occupants?

The perspective developed in the Virgin Section of this volume suggests that the well-adapted and relatively small Virgin population on the Grand Staircase, adopted the stylistic innovations of the "Kayenta" but quickly absorbed them into the existing Virgin tradition. Judging by the lack of Pueblo III ceramics and material culture on Virgin sites, the influence ceased by A.D. 1150. If the Kaiparowits Anasazi population originated in the Virgin region, as James Gunnerson proposed, this population might well be considered "Virgin-Kayenta." In this light, Florence Lister's insistence that they were "Kayentan" is actually quite compatible with Gunnerson's position.

On Fiftymile Mountain, whoever the immigrants were, and regardless of their previous architectural traditions, they essentially reinvented themselves in a new physical and, possibly, social environment. Logistical considerations appear to have been the main concern that influenced the types of sites and their distribution. The pattern suggests that residential mobility, perhaps similar to that described for the Fremont during the Wide Hollow Phase, was an integral part of their adaptive strategy.

Reconciling the Fremont Late Formative and the Fiftymile Mountain Phases

Since the 2000 draft of this monograph was written new data demonstrating the co-occurrence of Fremont and Anasazi occupation on a single site has prompted questioning the usefulness of retaining the Late Formative Phase. Based on their position that it spans the same time frame as the Fiftymile Phase, a late Fremont phase is considered redundant and cumbersome (Janetski et al. 2012). Kidder, Jennings, and Snook (1946) provide a concise definition of the phase concept that applies well to the situation in the study area:

"A cultural complex possessing traits sufficiently characteristic to distinguish it for purposes of preliminary archaeological classification, from earlier and later manifestations of the cultural development of which it formed a part, *and from other contemporaneous complexes*" (emphasis added).

As examples of Fremont and Anasazi co-occurrence the authors point to their own

excavations at Arrowhead Hill and other sites in the vicinity of Escalante. Whether Fremont and Anasazi sites are contemporary elsewhere in the region such as the Escalante Canyon system, the Escalante Desert, and Fiftymile Mountain remains to be seen. The position taken here is that we are obliged to assess and independently date sites in each of those localities to determine not only their age, but the relationship between them. Notwithstanding Matson's (1982) perspective of an intractable "socio-cultural continuum", this is a valid and achievable research objective that addresses the following issues: Did the Anasazi initially adopt or mimic the mobile Fremont strategy? Or, did the Fremont accept a sedentary Anasazi pattern? Did groups of Fremont continue to practice the Wide Hollow Phase settlement-subsistence strategy alongside Anasazi farmers? Is there evidence for Anasazi and Fremont farming strategies changing over time? If so, did the parallel adaptation persist for the duration of the Fiftymile Phase - or possibly even later?

Basically, if the Fremont remain an identifiable entity, in terms of subsistence strategy, rock art expression, residential mobility, artifacts and ceramics, or behaviors of any sort, they represent a viable cultural unit that can be compared and contrasted with their ancestral populations as well as new groups living among them. Organization of these data would best be accomplished by maintaining the Late Formative category until these issues are resolved.

Climate Change, Population Movement, and the "Pueblo II Expansion" on the Monument

Aikens (1966) concluded, after considerable survey and excavation in the Virgin region, that the notion of a Pueblo II expansion was not a period of great population movement in the Virgin and Kayenta regions but rather a period of in situ population growth (Aikens 1966:56). He saw local populations expanding out of valley environments to "heretofore unoccupied uplands" (Aikens 1966:56). It was a reasonable, if very general, alternative to the scenario of large populations moving about the Glen Canyon region looking for new agricultural lands to farm. Climate change was not identified as a potential cause for such movement, nor were adaptive behaviors such as mobility considered. It was a traditional, normative position based on

assumptions of the time regarding chronology and settlement.

Climate is the most critical variable for successful agriculture; the only option for a subsistence farmer to deal with it is movement. It is apparent that the Kaiparowits Plateau in general, and Fiftymile Mountain in particular, are challenging environmental settings in which to practice agriculture. Both the Fremont and the Anasazi farmed the plateau, albeit using different tactics and strategies. While the chronologies described in this volume for the Fremont, Virgin, and Virgin-Kayenta vary in precision they are at least adequate to begin considering identified population movements, abandonments, and changing adaptations with respect to the climate record.

Several paleo-climate reconstructions span all or portions of the study area (Gummerman 1988; Larson et al. 1996; Benson and Berry 2009). Benson and Berry's reconstruction is the most recent and relevant given their apparent geographical overlap with the study area. Both Larson et al. and Benson and Berry use tree-ring based reconstructions of the Palmer Drought Severity Index as proxies for conditions during the month of June. The three climate reconstructions have reasonable correspondence in general, although beginning and ending dates vary (Figure 179). The Benson and Berry reconstruction is the most recent, provides precise dates and will serve to organize a brief review of large-scale population movements in the study area. Causal relationships are not proposed here. In fact, the residential mobility strategy proposed for the Virgin Anasazi and a logistically organized strategy model for the Fremont may well have been able to "weather" adverse climate conditions and its consequences successfully. In both instances however, the case can be made that it was external population pressure that had the greatest impact on the local adaptive system. From a regional perspective, it could be that demographic pressures outside the Virgin area initiated population movements that local Virgin and Fremont populations were forced to respond to: that is to say, rather than responding to climate change per se, they reacted to the effects of population pressure.

Benson and Berry (2009) have proposed four primary climate periods that occurred during the time frame critical for understanding Fremont and Anasazi relationships; two wet periods favorable

for agriculture (Wet 1 and Wet 2) and two “megadroughts” (D3 and D4) (Figure 179). The following section correlates large-scale population movements in the study area possible responses to a variable climate.

A.D. 1045-1130 (Wet 1)

This period largely coincides with the PII “expansion” on the Grand Staircase. It is characterized as wetter (and perhaps cooler) than average and has been viewed as optimal for agriculture. Two large-scale population movements are recognized in the Virgin region during this period: 1) depopulation of the upper Virgin River just prior to A.D.1100 that occurred after a continuous occupation during BMIII, PI, and early PII times, 2) the “Kayenta” expansion or intrusion on the eastern Grand Staircase, as identified by the introduction of new architectural types and ceramic assemblage consisting of Tsegi Orange Ware, Sosi and Dogoszhi style white wares, and corrugated pottery.

The temporal relationship between these two events is based on the virtual absence of Late PII pottery types in the upper Virgin River and the sudden appearance of them in the Kanab area by A.D.1100. It is unclear as to whether the abandonment of the upper Virgin River and the subsequent increase in site numbers on the eastern Grand Staircase is simply coincident or represents population movement.

Tree-ring dates from the Kanab Creek/Cottonwood Canyon area provide good evidence for a construction episode of linear roomblocks and “kivas” about A.D. 1100. It is precisely these tree-ring dated sites that provide the material culture evidence for a rapid influx of “Kayenta” artifacts, architectural innovations, apparent population

movement but clearly significant increases in residential site numbers. This type of rapid change describes well as a result of immigration (Clark 2001). An alternative case can be made for a population shift that originated on the eastern Arizona Strip - perhaps House Rock Valley and surrounding uplands, and simply expanded on to the Monument. At present the chronology for those areas is based on little more than ceramic cross-dating.

Wide Hollow Phase radiocarbon dates on Fiftymile Mountain fall off about A.D.1000 suggesting occupation may have been limited during Wet1. This may be due to sampling error; with a continuous sequence beginning as early as A.D. 500 it is reasonable to assume that the plateau remained a part of Fremont settlement/subsistence strategy at least until the Fiftymile Mt. Phase. Additional dates during the period A.D.1000 and A.D. 1150 would clarify the situation.

In the Escalante valley several substantial Fremont residential sites (Arrowhead Hill, the Spencer site, Overlook, and Rattle Snake Point) strongly suggest contact, if not actual co-occupation with the Anasazi, as has been proposed (Janetski et al. 2012). The Circle Cliffs is another upland where an Anasazi intrusion into Fremont territory occurred late in the Wet 1 period.

It is conceivable that wet and cool temperatures during Wet1 might have made agriculture at lower elevations more favorable leaving Fiftymile Mountain only lightly, or even sporadically, populated (see Bellorado and Anderson 2013 for a discussion of the impacts of cool weather). A single tree-ring date of A.D. 980vv from 42Ka 1456 supports a Fremont presence. The radiocarbon date sequence (Figure 178) appears to be continuous from the Wide hollow Phase to the Fiftymile

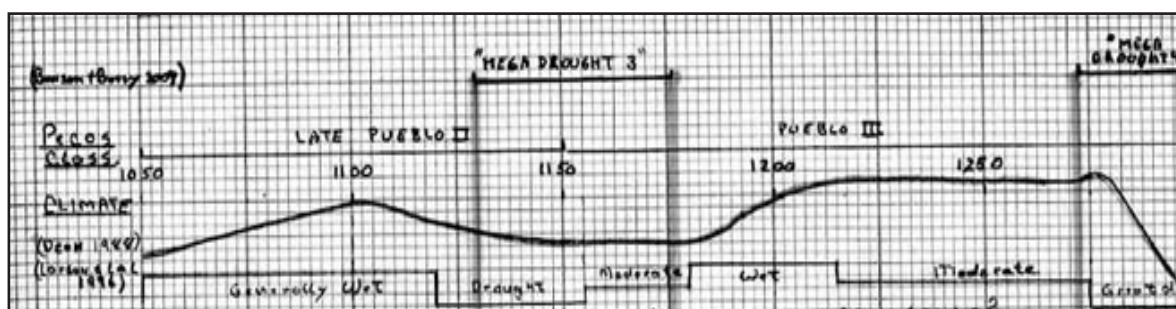


Figure 179. Graph of existing climate chronologies within the study area: after Gummerman et al. 1988; Larson et al. 1996, and Benson and Berry 2009.

Mountain Phase but could be deceptive. At present neither tree-ring nor radiocarbon dates offer much support for an Anasazi presence during the Wet 1 period.

A.D. 1130 -1177 (Mega Drought 3)

If the Anasazi origins on the Kaiparowits are Virgin affiliated, the events on the Grand Staircase during this period are critical to identifying potential “push and pull” factors between the two areas. The traditional date for Virgin abandonment, based ceramic cross-dating, is A.D. 1150. Indeed, the tree-ring record on the Grand Staircase ends precisely at A.D. 1150 (see Figure 114). In fact, radiocarbon dates indicate that Virgin occupation continued until at least A.D. 1250. The absence of Pueblo III Kayenta pottery types in the Virgin region strongly suggests that contact with the Kayenta ceased about the middle of Mega Drought 3; the implication for Fiftymile Mountain is that if the immigrants were Virgin, a PIII occupation could be masked there as well.

Nearly all Anasazi tree-ring dates on Fiftymile Mountain fall between A.D. 1150-1200; while radiocarbon dates support the tree-ring dated occupation, due to their imprecision, they may also allow for the occupation to extend into the A.D.1300's. If the Mega Drought 3 conditions do in fact apply to the Grand Staircase, favorable conditions for agriculture on Fiftymile Mountain and Boulder Valley may have provided the “pull.” Less clear are the settlement and demographic conditions in the eastern Virgin region during the mid A.D. 1100's that may have initiated a “push” during what may have been a period of stress. Climate induced stress may also have been occurred on the eastern Arizona Strip as well where movement to elevations to over 7,000 feet on the Paria Plateau also occurred during the first half of the 12th century.

Aikens, trying to make sense of the great variety of site types on Fiftymile Mountain, considered the possibility that he was dealing with multiple settlement patterns. Because most of the tree-ring dates in the chronology cluster around A.D. 1150 and are from a single site type - sheltered residential sites, they could represent an initial settlement that differed from a later, more established one. Several hypothetical settlement patterns, congruent with the great variety of site types on the plateau, can

be proposed: 1) A residentially mobile pattern, similar to the earlier Fremont, where farming was the primary focus but movement on and off the plateau occurred on a frequent basis 2) A traditional, sedentary pattern of permanent occupation as envisioned by the Glen Canyon investigators or 3) a hybrid of the two that involved expanded dry-farming but the retention of mobility.

Identifying subtle differences in site patterning that segregate into discrete settlements will require better temporal control over open sites than is presently available. What seems most telling is the continued use of granaries for the long-term storage of maize which is taken here as a strong indication of mobility evident throughout the entire Fremont-Anasazi sequence (Figure178). This suggests a similar and parallel settlement response by the Anasazi to conditions on the plateau; if not an actual “sociocultural continuum” then an adaptive continuum that meshed well with the Virgin pattern. Supporting this position are camps and limited activity sites on the surrounding benchlands and Escalante Desert some 2,500 feet below that were used by both the Fremont and Anasazi for logistical hunting and especially seed gathering forays. If granaries functioned to enhance mobility options, the pattern may have involved both seasonal foraging off the plateau, as well as returning to the Grand Staircase during good years.

In support of a traditional, sedentary settlement pattern are the clusters of small architectural sites that appear to be short-term occupations, i.e. field houses, associated with extensive dry farm settings. In addition, substantial masonry residential structures are known that could have served as winter residences - perhaps only during mild winters. These residential layouts, however, lack storage rooms that characterize traditional Virgin pueblos. In this case masonry granaries may be interpreted to have played a more traditional role. Typically these structures are located in well protected alcoves suitable for long-term storage. Several are known to be capable of fulfilling multiyear requirements of a typical household. As residences shifted around the plateau in response to field conditions these secure, carefully constructed, granaries may have been preferable to periodically constructing new ones.

A.D. 1193-1269 (Wet 2)

On the Grand Staircase radiocarbon dates

indicate occupation well into Pueblo III times. A single radiocarbon date from the Paria Plateau of A.D. 1170-1280 suggests persistence into PIII times there as well. While the latest tree-ring date on Fiftymile Mountain is A.D. 1189, radiocarbon dates allow for, but do not demonstrate, a later occupation. Due to complacent nature of pottery types, neither is ceramic cross-dating very effective. Short of actual excavation, luminiscence dating of pottery, or structural jacal, may be the most expedient means of demonstrating a Pueblo III presence on open sites.

Settlement History of Fiftymile Mountain

During the Wide Hollow Phase, A.D. 500-1050, Fremont agriculture was limited in scope and generally associated with small garden plots near seeps and springs. Numerous small cists associated with dated maize clearly indicate agriculture was successfully practiced. Occasional sand tempered, plain gray sherds suggest possible but limited contact with Anasazi populations (but see Geib 1996 for local manufacture as an alternate possibility). How long identifiable Fremont sites persisted on the plateau remains unclear. The presence of Emery Gray in small amounts on excavated Anasazi sites and the occasional late Anasazi white ware sherd on Fremont sites suggests they were contemporaneous. There are, however, relatively few absolute Anasazi dates on the plateau until the building episode in protected shelters begins around A.D.1150.

Grand Staircase populations were growing during the early A.D.1100's either as a result of internal growth, immigration, or both. Presently available tree-ring dates indicate Anasazi expansion to Fiftymile Mountain and the Coombs site occurred just after drought conditions began in A.D. 1130's. Both areas would have offered relief from drought; the Boulder valley is well-watered with small streams originating on the Aquarius Plateau; Fiftymile Mountain, at over 7,000 feet, was more than 1,000 feet higher than the elevations farmed on the Grand Staircase and offered increased effective precipitation. In terms of demographics, both areas were lightly populated and perhaps only seasonally occupied by the Fremont.

The climate correlated scenario presents a plausible cause for the significant population

movements on the Monument: About the time small and perhaps mobile groups of Fremont become less visible in the archaeological record, the Anasazi began dryfarming on the plateau in much larger numbers. The case for a similar "replacement" - not so much of people but a shift to more intensive agriculture, may have occurred about the same time in the Escalante valley, Boulder valley, and the Circle Cliffs. Essentially, the limited garden plots of the Fremont that were focused on streams, seeps, springs, and damp canyon bottoms were replaced or supplemented by extensive dry-farming.

Whether Anasazi adaptive strategies changed over time from an initial pioneering effort not unlike that of the Fremont, to a traditional sedentary pattern focused on dry farming, will probably require demonstration of a longer occupational span than the present record allows. If Anasazi occupation did persist into the A.D.1200's - as we might reasonably expect, extensive dry farming with attendant field houses might have been successful during the ameliorated conditions of Wet 2. By the same token, if Wet 2 was accompanied by cooler temperatures, elevations above 7,000 feet may not have been advantageous for farming. Present tree-ring and radiocarbon dates can only demonstrate an Anasazi occupation from A.D.1150 to A.D.1200. Some sort of Fremont association is suggested by the presence of Emery Gray pottery on many, if not most, Anasazi sites during the Fiftymile Mt. Phase.

Traditional thought on the final depopulation of the Virgin area (Aikens 1966:Lyneis 1996) is that they retreated to the east and joined the Kayenta - although as Lyneis has pointed out there is little evidence of such movement. As regards the final abandonment on the Kaiparowits Plateau, if the initial movement to Fiftymile was a tactical response to drought and the occupation ceased shortly after conditions improved, as the present chronometric data suggests, the Fiftymile folk may have simply rejoined Virgin populations to the west. On the other hand, if they remained through Pueblo III times, positioned on the edge of Fremont territory as it were, they might have had a very different response. Rather than heading east and south to join the aggregated and troubled villages in the Kayenta heartland, they may have exercised an option to move north and join the Fremont who by this point were, if not their kin, were likely kith.

REFERENCES

Aikens, C. Melvin

- 1962 The Archeology of the Kaiparowits Plateau, Southeastern Utah. Master's Thesis on file at the University of Chicago.
- 1965 *Excavations in Southwest Utah*. University of Utah Anthropological Papers No.76. Salt Lake City.
- 1967 *Virgin - Kayenta Cultural Relationships*. University of Utah Anthropological Papers No. 79. Salt Lake City.

Ahlstrom, Richard V.N. (Editor)

- 1999 *Pithouse Excavations at the Park Wash Site (42Ka4280)*. HRA Papers in Archaeology No.1. Las Vegas. HRA, Inc. Ms on file at the Grand Staircase-Escalante national Monument Headquarters, Kanab.

Allison, James R.

- 1990 Anasazi Subsistence in the St. George Basin, Southwestern Utah. Master's thesis on file at the Department of Anthropology, Brigham Young University, Provo.
- 1996 Comments on the Impacts of Climatic Variability and Population Growth on Virgin Anasazi Cultural Development. *American Antiquity* 61:414-418.
- 1988 *The Archaeology of Yellowstone, Mesa, Mojave County, Arizona*. Brigham Young University Museum of Peoples and Culture Technical Series No. 88-24. Brigham Young University, Provo, Utah.
- 2008 Shinarump Red Ware and Other Red Ware Pottery North and West of the Colorado River. *Pottery Southwest* 27: 21-34.

Altschul, J. H., and Helen C. Fairley

- 1989 *Man, Models, and Management: An Overview of the Archaeology of the Arizona Strip and the Management of its Cultural Resources*. Report prepared for the USDA Forest Service and the USDI Bureau of land Management.

Ambler, J. Richard

- 1985 Northern Kayenta Ceramic Chronology. In *Archaeological Investigations Near Rainbow City, Navajo Mountain, Utah*, edited by Phil R. Geib, J. Richard Ambler, and Martha M. Callahan, pp. 28-68. Northern Arizona University Archaeological Report 576, Flagstaff.

References

- Baadsgaard, Aubrey
N.D. Kayenta Anasazi Ceramics - New Data from excavations at the Lampstand Ruins. Manuscript on file at the Grand Staircase-Escalante national Monument.
- Baadsgaard, Aubrey, and Aaron Fergusson
1999 *Test Excavations at the Lampstand Ruins: A Kayenta Anasazi Site in the Northern Circle Cliffs, South-Central Utah*. Brigham Young University Museum of Peoples and Cultures, Technical Series No. 98-5.
- Baker, Shane A., Joel C. Janetski, Lane D. Richens, and Richard K. Talbot
1999 *Broken Arrow Cave (42Ka4356):1997 Testing Results*. Brigham Young University Museum of Peoples and Cultures Technical Series No. 99-5. Provo, Utah. Prepared for Bureau of Land Management Kanab Resource Area. Kanab, Utah.
- Benson, Larry V. and Michael S. Berry
2009 Climate Change and Cultural response in the Prehistoric American Southwest. *Kiva* 75: 87-117.
- Bernardini, Wesley
2005 Reconsidering Spatial and Temporal Aspects of Prehistoric Cultural Identity: A Case study from the American Southwest. *American Antiquity* 70:31-54.
- Berry, Michael S.
1982 *TIME, SPACE AND TRANSITION IN ANASAZI PREHISTORY*. University of Utah Press. Salt Lake City.

2000 Chronometry and Process: Southwestern Agricultural Beginnings. A paper presented at the SAA 65th Annual Meeting.
- Black, Kevin D. and Michael D. Metcalf
1986 *The Castle Valley Archaeological Project: An Inventory and Predictive Model of Selected Tracts*. Salt Lake City. Utah Cultural Resource Series No. 9. Bureau of Land Management, Utah.
- Dean, Jeffrey S, Robert C. Euler, George J. Gummerman, Fred Plog, Richard H. Hevly, and Thor N.V. Karlstrom
1985 Human Behavior, Demography, and Paleoenvironment on the Colorado Plateaus. *American Antiquity*. 50,3.
- Baker, Katie A.
2001 *The Escalante Drainage Project: The Benches 2000*. Brigham Young University Museum of Peoples and Cultures Technical Series No. 01-3. Provo.
- Baker, Shane A. and Lorna Billat
1992 Late Basketmaker Archaeology On The Middle Virgin River, Washington County, Utah. *Utah Archaeology*. Salt Lake City.
- Baker, Shane A., Joel C. Janetski, Lane D. Richens, and Richard K. Talbot
1999 *Broken Arrow Cave (42Ka4356): 1997 Testing Results*. Brigham Young University Museum of Peoples and Cultures Technical Series No. 99-5. Provo, Utah.
- Bannister, Bryant, Jeffrey S. Dean and W.J. Robinson
1969 TREE-RING DATES FROM UTAH S-W, SOUTHERN UTAH AREA. Laboratory of Tree-Ring Research, The University of Arizona.

- Bettinger, Robert L.
 1993 Doing Great Basin Archaeology Recently: Coping with Variability. *Journal of Archaeological Research*, Vol. 1 No. 1.
- Billat, Lorna Beth
 1990 Archaeological Testing and Excavation of Five Western Anasazi sites along State Route 9, East of Virgin City, Utah. *Brigham Young University Museum of Peoples and Cultures Technical Series No. 90-20*. Office of Public Archaeology, Brigham Young University, Provo.
- Breternitz, David A.
 1966 An Appraisal of Tree-Ring Dated Pottery in the Southwest. *Anthropological Papers of the University of Arizona* No. 10. Tucson.
- Buck, Paul E., and Laureen Perry
 1999 A Late Basketmaker Storage and Habitation Site Near Hurricane, Utah. *Kiva*, Vol. 64:471-494. Arizona Archaeological and Historical Society.
- Charles, Mona C. and Sally J. Cole
 2006 Chronology and Cultural Variation in Basketmaker II. *Kiva* 72: 167-216.
- Christensen, Don D., Jerry Dickey and Steven M. Freers
 2013 *Rock Art of the Grand Canyon Region*. Sunbelt Publications, Inc. San Diego.
- Clark, Jeffery J.
 2001 *Tracking Prehistoric Migrations Pueblo Settlers among the Tonto Basin Hohokam*. *Anthropological Papers of the University of Arizona* No. 65. University of Arizona Press, Tucson.
- Collette, Jim M.
 2009 Shinarump Gray and White Ware: A 75-year Retropective, Part 1. *Pottery Southwest* 28: 2-11. Albuquerque Archaeological Society.
- Colton, Harold S.
 1952 *Pottery Types of the Arizona Strip and Adjacent Areas in Utah and Nevada*. Museum of Northern Arizona Ceramic Series No. 1. Northern Arizona Society of Science and Art, Flagstaff.
- Cordell, Linda Scott
 1984 *Prehistory of the Southwest*. Academic Press, San Diego.
- Coulam, Nancy J.
 1989 *Plant Remains*, in Cultural Resource Investigations Near Kanab, Utah: Excavation and Structural Stabilization at Cottonwood Canyon Cliff Dwelling by Betsy L. Tipps. Report on file at the Kanab Resource Area Office, Bureau of Land Management.
- Cummings, Linda Scott
 1995 *Pollen Analysis At Site 42Ka3976, Southwest Utah*. Paleo Research Labs Technical Report 94-03C. Denver, Colorado.
- Dalley, Gardiner F. and Douglas A. McFadden
 1985 *The Archaeology of the Red Cliffs Site*. Cultural Resource Series No. 17. Bureau of Land Management, Utah.

References

- 1988 *The Little Man Archaeological Sites: Excavations On The Virgin River Near Hurricane, Utah*. Cultural Resource Series No. 23. Bureau of Land Management, Utah.
- Dean, Jeffrey S., Robert Euler, George J. Gunnerman, Fred Plog, Richard H. Hevly, and Thor N.V. Karstrom
1985 Human Behavior, Demography, and Paleoenvironment on the Colorado Plateau. *American Antiquity* 50:537-554.
- Dernbach, Lisa
1992 Demographics, Climatic, and Settlement Pattern Change Among the Western Anasazi of Kane County, Utah. Master's thesis on file at the Department of Anthropology, University of California, Long Beach.
- Dodd, Walter A. Jr
1982 *Final Year Excavations at the Evans Mound Site*. University of Utah Anthropological Papers No 106. SLC.
- Dohr, Susan Lintz
1994 Demographic, Climatic, and Settlement Pattern Change Among the Western Anasazi of Kane County. Unpublished Master's thesis on file at the Department of Anthropology, California state University Long Beach.
- Eccles, Cindy A., and Walling-Frank, Barbra
1998 Chipped and Ground Stone Tool Analysis. *Excavation/Mitigation Report Three Sites Near Hildale, Utah 42WS2195, 42WS2196, AZ B:1:35 (BLM) (Reservoir Site)*, compiled by Asa S. Nielsen. pp. 10.1-10.67. Baseline Data, Inc. Orem, UT.
- Edgar, Heather Joy Hecht
1994 Osteology and Odontology of Basketmaker II Virgin Anasazi From Kane County, Utah. Unpublished Master's thesis on file at the Department of Anthropology, Arizona State University, Tempe.
- Euler, Robert C.
1994 Aspects of the Virgin Anasazi Tradition in Grand Canyon. *UTAH ARCHAEOLOGY* 1994. 7:99-103.
- Fawcett, William B. And William R. Latady
1997 Investigating Human Land Use Within the Grand Staircase Escalante National Monument: The Roles of Archaeological Surveys. In *Learning From the Land Science Symposium Proceedings*. Cedar City, Utah.
- Fiero, Kathleen
2000 Preservation Maintenance: Grand Staircase-Escalante National Monument, Kane County, Utah 1999: sites 42Ka1551, 42Ka4860, 42Ka811. Mesa Verde National Park.
- Firor, James
1994 Excavation of Two Prehistoric Southern Paiute Sites near Kanab, Utah. Alpine Archaeological Consultants, Montrose, Co. Ms on file , BLM Kanab Field Office, Kanab Utah.
- Fowler, Don D.
1961 *1961 Excavations*. University of Utah Anthropological Papers No.64. Salt Lake City.

- Fowler, Don D. and C. Melvin Aikens
 1963 *1961 Excavations, Kaiparowits Plateau*. University of Utah Anthropological Papers No.64 Salt Lake City.
- Frank, Barbara W.
 1996 The 1996 Southern Utah University Field School Excavations at 42Ws3119 in Washington County, Utah. Ms on file SUU Cedar City.
- Fritz, Noreen R. and K. Fierro
 2001 Preservation Maintenance: Grand Staircase-Escalante National Monument, Kane County Utah sites 42Ka1248, 42Ka1520, 42Ka2301, 42Ka4865 and 42Ka 4870. Mesa Verde National Park.
- Fumiyasu, Arakawa, C. Nicholson and Jeff Rasic
 2013 The Consequences of Social Processes: Aggregate Populations, Projectile Point Accumulation, and Subsistence Patterns in the American Southwest. *American Antiquity* 78: 147-164.
- Geib, Phil R.
 1989 *Archaeological Survey of Lower Glen Canyon Benches and a Descriptive Model of General Site Location*. Northern Arizona University Archaeological Report, Flagstaff.
 1996 *Glen Canyon Revisited*. University of Utah Press Anthropological Papers No.119. Salt Lake City.
 2000 Basketmaker II Horn Flakers and Dart Point Production: Technological Change at the Agricultural Transition. A paper presented at the Southwest Symposium.
- Geib, Phil R. and Peter W. Bungart
 1989 Implications of Early Bow Use In Glen Canyon. Utah *Archaeology* 1989 1:32-47.
- Geib, Phil R. and Helen C. Fairley
 1997 Archaeological Research in the New Monument: Lessons From Glen Canyon. In *Learning From the Land Grand Staircase Escalante National Monument Science Symposium Proceedings*. SUU, Cedar City Utah.
- Geib, Phil R. and Margaret M. Lyness
 1996 Sources of Igneous Temper for Fremont Ceramics in *Glen Canyon Revisited*. University of Utah Press Anthropological Papers No.119. Salt Lake City.
- Geib, P.R. and K. Spurr
 1997 The Basketmaker II-III Transition on the Rainbow Plateau. In *Critical Issues in Basketmaker III Research*, edited by P. Reed. Ms. in review, Navajo Nation Archaeology Department, Farmington, NM.
- Geib, Phil R., Jim H. Collette and Kimberly Spurr
 2001 *KAIBABITSINUNGWU An Archaeological Sample Survey of the Kaiparowits Plateau*. Utah BLM Cultural Resource Series No. 25. Grand Staircase-Escalante National Monument Special Publication No. 1.
- Gladwin, Winifred and Harold S. Gladwin
 1934 A Method for the Designation of Cultures and Their Variations. *Medallion Papers*, No.15. Globe.

References

- Glascok, Michael D., Hector Neff, Daniel O. Larson
 1997 *The Evolution of Anasazi Ceramic Production and Distribution: Compositional Evidence from a Pueblo III Site in South-Central Utah*. Journal of Field Archaeology Vol. 24: 473-491. Editor, Ricardo J. Elia. Boston University, Massachusetts.
- Graffam, Merle H.
 1996 A Portfolio of Illustrations of Rock Art Found within and Around the Environs of Broken Arrow Cave (42KA4356). Ms on file at the Bureau of Land Management Kanab Field Office.
- Gunnerson, James H.
 1959a Archaeological Survey of the Kaiparowits Plateau. In *The Glen Canyon Archaeological Survey*, by D.D. Fowler, J.H. Gunnerson, J.D. Jennings, R.H. Lister, D.A. Suhm and T. Weller, pp.318-471. Anthropological Papers No.43. Salt Lake City: University of Utah Press. Salt Lake City.
 1959b *1957 Excavations, Glen Canyon Area*. University of Utah Anthropological Papers No.43. Salt Lake City: University of Utah Press.
 2002 Escalante Area Archaeology (Discussion of Symposium Papers). Prepared for the "Heart of the Desert Wild Symposium." Manuscripts on file GSENM. 67th Annual Society for American Archaeology Meeting. Denver.
- Hard, Robert J. and W.L. Merrill
 1992 Mobile Agriculturalists and the Emergence of Sedentism. *American Anthropologist* 94:601-620.
- Hauck, F.R.
 1979 *Cultural Resource Evaluation in South Central Utah 1977*. Cultural Resource Series No.4 USDI Bureau of land Management, Utah State Office, Salt Lake City.
- Heath, Kathleen M.
 1988 *Macrofossil and Micro-refuse Analysis from the Boulder Project*. In, The Boulder Archeological Project. Compiled by Marian Jacklin. Ms. on file at the Dixie National Forest, Cedar City Utah.
- Heid, James
 1979 *A Research Design of the Initial Random Stratified Survey for the Little Creek Mountain Project*. Western Anasazi Reports Vol. 2, No. 3. Southern Utah State College.
 1982 *Settlement Patterns on Little Creek Mountain, Utah*. Western Anasazi Reports Vol. 3, No. 2. Southern Utah State College.
- Hegmon, Michelle, James R. Allison, Hector Neff, and Michael S. Glascok
 1997 Production of San Juan Red Ware in the Northern Southwest: Insights into Regional Interaction in early Puebloan Prehistory. *American Antiquity* 62: 449-463.
- Hereford, Richard
 1986 Modern Alluvial History of the Paria River Drainage Basin, Southern Utah. In *Quaternary Research* 25,293-311.
- Hewitt, Nancy J.
 1980 *Fiber Artifacts*. In Cowboy Cave, by Jesse D. Jennings. University of Utah Anthropological Paper No 104.Salt Lake City.

- Holmer, Richard N.
 1980 Projectile Points, In *Sudden Shelter* by Jesse D. Jennings, Alan R. Schroedl, and Richard N. Holmer. University of Utah Anthropological Papers, No. 103. Salt Lake City.
- Holmes, W.H.
 1886 *Pottery of the Ancient Pueblos*. Fourth Annual Report, Bureau of Ethnology. Washington.
- Jacklin, Marian (Compiler)
 1988 The Boulder Archeological Project. Ms on file Dixie National Forest. Cedar City.
- Janetski, Joel C. and Richard K. Talbot
 1997 Learning to Preserve and Preserving to Learn: A Case Study in Grand Staircase - Escalante National Monument Archaeological Research. In *Learning From the land Grand Staircase-Escalante National Monument Science Symposium Proceedings*. Southern Utah University, Cedar City, Utah.
- Janetski, Joel C. and James D. Wilde
 1989 A Primary Report of Archaeological Excavations at Antelope Cave and Rock Canyon Shelter, Northwestern Arizona. *Utah Archaeology* 1989 1:88-106.
- Janetski, Joel C., Lane D. Richens, and Richard K. Talbot
 2012 Fremont-Anasazi Boundary Maintenance and Permeability in the Escalante Drainage. In *Meetings at the Margins: Prehistoric Cultural Interactions in the Intermountain West*. Edited by David Rhode, pp.191-210. University of Utah Press, Salt lake City.
- Jenkins, Dennis L.
 1981 Cliff's Edge: A Pueblo I site on the Lower Virgin River. Master's thesis on file at the University of Las Vegas.
- Jennings, Calvin H.
 1967 An Archaeological Reconnaissance in the Paria Canyon, Arizona-Utah. In, *Western Anasazi Reports*. Edited by Richard Thompson. Museum of Southern Utah. Cedar City.
- Jennings, Jesse D.
 1966 *Glen Canyon: A Summary*. University of Utah Anthropological Papers, No. 81, Glen Canyon Series No.31. Salt Lake City.
 1978 *Prehistory of Utah and the Eastern Great Basin*. University of Utah Anthropological Papers No. 98. Salt Lake City.
- Jones, Teah
 1998 Petrographic Analysis For: Sherds from BYU's 1996 and 1997 Capital Reef Field Schools and a Type Collection from Fiftymile Mountain. Manuscript on file at the Brigham Young University Department of Anthropology. Provo.
- Jones, Anne Trinkle
 1986 *A CROSS SECTION OF GRAND CANYON ARCHEOLOGY: Excavations at Five Sites Along the Colorado River*. Western Archeological and Conservation Center, Publications in Anthropology No.28. Tucson, Arizona.
- Jordan, Aaron and Richard K. Talbot
 2002 The BYU Escalante Drainage Project: Big Flat and Escalante Canyon Area 2001. BYU Museum of Peoples and Cultures Technical Series No.01-13. Provo.

References

- Judd, Neil M.
1926 Archeological Observations North of the Rio Colorado. *Bureau of American Ethnology*. Bulletin 82.
- Kearns, T.M.
1982 The Escalante Project; A Class II Cultural Resource Inventory of Preference Right Coal Lease Tracts in south Central Utah. On file, BLM, Grand Staircase-Escalante National Monument, Kanab.
- Keller, Donald R.
1987 *Archaeological Investigations, Utah International, Inc., Alton Coal Project, Kane County, Utah*. Report A-86-50. Copy on File, Grand Staircase Headquarters Kanab, Utah.
2000 Archaeological Survey of the Escalante River Canyon, Highway 12 to the Glen Canyon NRA Boundary, Garfield County, Utah. Manuscript submitted to the Grand Staircase - Escalante National Monument. Kanab, Utah.
2001 Archaeological Survey of the Gulch, Burr Trail to the Escalante River, Garfield County, Utah. Manuscript submitted to the Grand Staircase-Escalante National Monument, Kanab.
- Keller, G. N.
1966 Final Report of the Director of the Bureau of Land Management on Stabilization of Indian Ruins near Kanab, Utah. Department of Sociology, Social Work, Anthropology, Utah State University, Logan.
- Kelly, Isabel T.
1971 Southern Paiute Bands. *American Anthropologist*. 36 (4): 547-560.
- Kelly, Robert L.
1992 Mobility/Sedentism: Concepts, Archaeological Measures, and Effects. *Annual Review of Anthropology* 1992. 21:43-66.
- Kulp, Thomas R.
1995 QUATERNARY PALEOCLIMATE VARIATION AS EVIDENCED BY PALEOSOLS: IMPLICATIONS FOR ANTHROPOGENIC IMPACT ON LANDSCAPE INSTABILITY AROUND AN ANASAZI SITE IN KANE COUNTY, UTAH. Master's thesis on file at the Department of Geology, East Carolina University.
- Kvamme, Kenneth L., and Paul R. Nickens
1981 *Archaeological Investigations at the Kanab Site Kane County, Utah*. In, *Excavation of Two Anasazi Sites in Southern Utah*. Utah Cultural Resources Series No. 9. BLM.
- Landon, Amanda
2011 Archaeological Site Distribution in the Telegraph Flat and Fivemile Valley Areas of the Grand Staircase-Escalante National Monument. Manuscript on file at the Grand Staircase-Escalante National Monument, Kanab.
- Larson, Daniel O. , Hector Neff, Donald Graybill, Joel Michaelsen, and Elizabeth Ambos
1996 Risk, Climatic Variability, and the Study of Southwestern Prehistory: An Evolutionary Perspective. *American Antiquity* 61:2:217-241.
- Latady, William R. and Todd Prince
1994 The Coombs Site: Continuing Excavations at a Kayenta Anasazi Village. A paper presented at the 24th Great basin Anthropological Conference, Elko Nevada.

- Lindsay, La Mar W.
 1983 *Pollen Analysis of Antelope Cave Cultural Deposits and Coprolite Samples*. Brigham Young University Department of Anthropology Technical Series No. 83-73. Joel C. Janetski, and Michael J. Hall.
- Lindsay, Alexander J.
 1968 *Survey and Excavations North and East of Navajo Mountain, Utah, 1959-1962*. Museum of Northern Arizona Bulletin No.45, Glen Canyon Series No.8. Flagstaff.
- Lipe, William D., J. Richard Ambler, Mary Anne Stein, Philip M. Hobler
 1960 *1958 Excavations, Glen Canyon Area*. University of Utah Anthropological Papers No. 44. SLC.
- Lipe, William D.
 1970 Anasazi Communities in the Red Rock Plateau, Southeastern Utah. In *Reconstructing Prehistoric Pueblo Societies*, edited by W.A. Longacre, pp. 84-139. Albuquerque: University of New Mexico Press.
- Lipe, William D. and Alexander J. Lindsey, Jr.
 1983 Pueblo Adaptations in the Glen Canyon Area. Paper presented at the 2nd Anasazi Symposium, Farmington, New Mexico.
- Lister, Florence
 1964 *KAIPAROWITS PLATEAU AND GLEN CANYON PREHISTORY: An Interpretation Based on Ceramics*. University of Utah Anthropological Papers No.71. SLC.
- Lister, Robert H.
 1959 *THE COOMBS SITE*. University of Utah Anthropological Papers No.41, SLC.
- Lister, Robert H. and Florence C. Lister
 1961 *THE COOMBS SITE Part III, Summary and Conclusions*. University of Utah Anthropological Papers No.41 SLC.
- Lister, Robert H., J. Richard Ambler and Florence C. Lister
 1960 *The Coombs Site Part II*. University of Utah Anthropological Papers No.41 SLC.
- Lyneis, Margaret M.
 1986 A Spatial Analysis of Anasazi Architecture A.D. 950-1150, Moapa Valley, Nevada. *Kiva* 53:53-74.
 1995 The Virgin Anasazi, Far Western Pueblos. *Journal of World Prehistory*. Vol.9, No.2. Plenum.
 1996 Pueblo II-Pueblo III Change in Southwestern Utah, the Arizona Strip, and Southern Utah. *The Prehistoric Pueblo World, A.D.1150-1350*. The University of Arizona Press, Tucson.
 1998 The Shinarump Problem 2. Plain Ware and Red Ware Adrift on a Sea of Sand. Department of Anthropology, University of Nevada, Las Vegas.
 1999 Basketmaker Maize From Southern Nevada. A paper presented at the 64th Annual Meeting of the Society for American Archaeology, Chicago.
- Lyneis, Margaret M., and Thompson, Richard A.
 1979 *A Test Case for Horticultural Dependence Among the Western Anasazi of Little Creek Mountain in Southern Utah: A Project Proposal*. Western Anasazi Reports Vol. 2, No. 3. Southern Utah State College.

References

- 1986 A Spatial Analysis of Anasazi Architecture, A.D. 950-1150, Moapa Valley, Nevada. *Kiva*. Vol. 52, No. 1.
- 1999 A Guide to Virgin Ceramics. Presented at the Ceramics Workshop Jennifer Jack-Dixie Chapter, Utah Statewide Archaeological Society. Ms on file University of Nevada, Las Vegas.
- 2012 A Synopsis of the Yamashita Sites. In A Prehistoric Context for Southern Nevada, Appendix D, edited by Richard V.N. Alstrom and Heidi Roberts. Prepared for the Nevada State Historic Preservation Office.
- Madsen, David B.
- 1997 A Preliminary Assessment of Archaeological Resources within the Grand Staircase - Escalante National Monument. Utah Geological Survey Circular No. 95. Salt Lake City.
- Madsen, David B. and S.R. Simms
- 1998 The Fremont Complex: A Behavioral Perspective. *Journal of World Prehistory* 12 (3) 255-336.
- Madsen, Rex E.
- 1977 *Prehistoric Ceramics of the Fremont*. Museum of Northern Arizona Ceramic Series No. 6. Flagstaff, Arizona.
- Martin, Steve
- 1993 A Macrobotanical Analysis of Soil sample From Room 1 of site 42Ka1568. Manuscript on file at Grand Staircase Escalante National Monument Hq, Kanab.
- 1996 Dietary Reconstruction for the Virgin River Branch Anasazi: Subsistence in a Marginal Environment. PhD. dissertation on file at the Anthropology Department University of California, Los Angeles.
- 1999 Virgin Anasazi: Diet as Demonstrated through the Analysis of Stable Carbon and Nitrogen Isotopes. *Kiva*. 64:495-514.
- Marwitt, John P.
- 1970 *Median Village and Fremont Regional Variation*. University of Utah Anthropological Papers No 95. Salt Lake City.
- Maxfield, E. Blair
- 1983 *Geology of Antelope Cave, Arizona Strip*. Brigham Young University Department of Anthropology Technical Series NO. 83-73. Joel C. Janetski, and Michael J. Hall.
- McFadden, Douglas A.
- 1982 Archeological Clearance Investigation of the Window Sash Bench Chaining - Kaiparowits Plateau. Report on file at the Kanab Field Office, BLM.
- 1988 Kaiparowits Revisited. *The UPAC News*. Published by the Utah Professional Archeological Council.
- 1993 Review of; The Main Ridge Community at Lost City. *Utah Archaeology* 1993.
- 1996 Virgin Anasazi Settlement and Adaptation on the Grand Staircase. *Utah Archaeology* 1996.
- 1997 Fremont Settlement in the Upper Escalante Drainage. A paper presented to the 1997 Society for Archaeology Annual Meeting. Nashville.

- 1998 A Tale of Two Adaptations: Formative Settlement on the Grand Staircase-Escalante National Monument. *Learning From the Land Grand Staircase-Escalante National Monument Science Symposium Proceedings*. Southern Utah University, Cedar City.
- 1999 Prehistoric Big Game Hunting on the GSENM: Implications for Modern Wildlife Management. A version presented at the March 1999 annual meeting by Harry Barber to the Utah Chapter of the Wildlife Society. Bryce Canyon National Park.
- 2000a The Arroyo Site, 42Ka3976: Archaic Level Investigations. *Utah Archaeology* 2000.
- 2000b *The Skutumpah Mammoth Excavation*. Cultural Resource Management Vol.23, No. 3. USDI, National Park Service.
- 2004a House Rock Valley Inventory: Pleasant Valley Outlet Tract: An Alluvial fan Outwash System on the Arizona Strip. Submitted to the Arizona Strip Field Office, Arizona State Trust Lands and the Arizona State Museum.
- 2004b Rainbow Bridge-Monument Valley Expedition Reconnaissance Inventory, Fiftymile Mountain. Report on file at the GSENM, Kanab.
- 2007 Kanab Creek Archaeological Project: 42Ka3831, F18 Burial Excavations. Submitted to the Utah Public Lands Policy Coordination Office.
- 2008 Archaeological Investigations on the Paria Plateau, Vermilion Cliffs National Monument, 2007: The White Knolls Survey, Site Mapping of Selected site at White Knolls and Test Excavations at West Bench Pueblo. Submitted to the Vermilion cliffs national Monument, Bureau of Land Management, St George.
- 2009 The Parunuweap Cultural Resource Inventory. Submitted the USDI, BLM Kanab Field Office by Cultural Site Management and Research, Baltimore.
- 2010 Archaeological Investigations on the Paria Plateau, Vermilion Cliffs National Monument 2008 and 2009: The pinnacle Ridge and White Knolls Surveys. submitted to the Vermilion Cliffs National Monument, Bureau of Land Management, St. George.
- 2011a Fiftymile Mountain Agricultural Adaptations and Settlement History. Poster session, 2011 Annual Pecos Conference, Kaibab National Forest.
- 2011b The Basket Maker II Horizon: A View from the Grand Staircase. *Southwestern Lore*. 77, No. 2 and 3: 119-128.
- 2012 *Excavations at the Arroyo Site, 42Ka3976: A Pueblo II/III Virgin Anasazi Farmstead*. Utah Cultural Resource Series No. 27, Grand Staircase- Escalante National Monument Special Publication No.3. Bureau of Land Management, Utah.
- Morley, Selma
- 1993 A Study of the Final Occupation of 42Ka1568: Demographics, Climate and Settlement Pattern Change Among the Western Anasazi. Master's thesis on file at the Department of Anthropology, University of California, Long Beach.
- Morgenstein, Maury E. And William Latady
- 1997 Proveniencing Intrusive Trade Ware and Local pottery by Magnetic Susceptibility Measurements, Geochemical and Petrographic Analysis: The Coombs Site, 42GA34. In *Learning From the Land Grand Staircase-Escalante National Monument Science Symposium Proceedings*. BLM.

References

- Metcalf, Duncan
1981 *The Gnatmare Site*. University of Utah Archeological Center. Salt Lake City.
- Morss, Noel
1931 *The Ancient Culture of the Fremont River in Utah*. Papers of the Peabody Museum of American Archaeology and Ethnology, Harvard University. Vol.XII, No3. Cambridge.
- Nash, Robert B.
2013 Data Recovery at Sites 42Ka4478 and 42Ka6293 along Kanab Creek Kane County, Utah. Prepared for the Federal Highway Administration and the BLM, Grand Staircase-Escalante National Monument. MOAC Report No. 08-04.
- Naylor, Laird P. II
1996 A GEOARCHEOLOGICAL EVALUATION OF CORRAL CANYON, MOHAVE COUNTY, ARIZONA. Master's thesis on file at Northern Arizona University.
- Neff, Hector, Daniel O. Larson and Michael D. Glascock
1997 The Evolution of Anasazi Ceramic Propuction and Distribution: Compositional Evidence from a Pueblo III site in South - Central Utah. *Journal of Field Archaeology* 24:473-491.
- Nelson, B.A. and Roger Anyon
1996 Fallow Valleys: Asynchronous Occupations in Southwestern New Mexico. *The Kiva* 61:275-294.
- Nickens, Paul R.
1985 A Human Burial From Kane County, South central Utah. Prepared for the Bureau of Land Management, Kanab Resource Area Office.
- Nielson, Asa S.(Compiler)
1998 Excavation/Mitigation Report Three Sites Near Hildale, Utah 42WS2195,42WS2196,AZ B:1:35 (BLM)(Reservoir Site) Submitted by Baseline Data to the Utah and Arizona Bureau of Land Management State Offices.
- Nusbaum, Jesse
1922 A Basket-maker Cave in Kane County, Utah. Museum of the American Indian, *Heye Foundation, Indian Notes and Monographs, Miscellaneous Series*, No. 29. New York.
- Patterson, Jody J.
2014 Preliminary Testing Report of Site 42Ka7714 at Milepost 67.8, Kane County (Interim report provided by Montgomery Archaeological Consultants). On file at the GSENM.
- Plog, Fred, George J. Gummerman, Robert C. Euler, Jeffrey S. Dean
1988 Richard H. Hevly and Thor N.V. Karlstrom. Anasazi Predictive Strategies: the Model, Predictions and Results. In, *The Anasazi in a Changing Environment*. Edited by George J. Gummerman, pp.230-277. Cambridge University Press, Cambridge.
- Prince, Todd
2000 *The 1990-1991 Excavations at the Coombs Site*. Manuscript on file at Anasazi State Park. Boulder, Utah.
- Prince, Todd, William R. Latady, and W. Geoffrey Spaulding
1997 Anasazi Occupation in the Northeastern portion of the GSENM. In *Learning from the Land Grand Staircase-Escalante National Monument Science Symposium Proceedings*. USDI, BLM.

- Reed, L.S., C.D. Wilson, and K. Hays-Gilpin
 1997 Basketmaker Ceramic Technology: From Early Ceramic Horizon to the Development of Regional Traditions. In *Critical Issues in Basketmaker III Research*, edited by P. Reed. Ms. in review, Navajo Nation Archaeology Department, Farmington, NM.
- Roberts, Heidi
 1991 A Comparative Analysis of Human Skeletal Remains From Parowan Fremont, Virgin Anasazi and Kayenta Anasazi Archaeological Sites. Master's thesis on file at the University of Nevada, Las Vegas.
- Roberts, Heidi, Richard Alstrom, and Douglas McFadden
 1998 42Ka4280 excavation feature notes. On file at the Kanab Field Office, BLM.
- Robinson, William J. and Cathrine M. Cameron
 1991 A Directory of TREE-RING DATED PREHISTORIC SITES in the AMERICAN SOUTHWEST. Laboratory of Tree-Ring Research, University of Arizona.
- Schaafsma, Polly
 1971 *The Rock Art of Utah*. Papers of the Peabody Museum of Archaeology and Ethnology. Vol.65. Harvard University. Cambridge.
 1980 *Indian Rock Art of the Southwest*. University of New Mexico Press, Albuquerque.
- Schleisman, Dean, and Asa S. Neilson
 1988 *Archaeological Excavations at Hog Canyon Dune (Site 42KA2574, Hog Creek Canyon, Kane Co. Utah*. Museum of Peoples and Cultures Technical Series No. 87-26. BYU, Provo, Utah.
- Schroeder, Albert H.
 1955 *Archaeology of Zion Park*. University of Utah Archeological Paper # 22. Salt Lake City.
- Silva, Billy
 1999 A Comparative Analysis of Ceramic Wares from Pottery Knoll (42Ka1568). Master's thesis on file at the Department of Anthropology, University of California, Long Beach.
- Schaub, Megan
 2003 Slab-Lined Pit features on Big Flat in Grand Staircase-Escalante National Monument. Master's thesis on file Department of Anthropology, Brigham Young University, Provo.
- Smiley, Francis E. and Michael R. Robins (Editors)
 1997 Early Farmers in the Northern southwest: Papers on Chronometry, Social Dynamics, and Ecology. *Animas-La Plata Archaeological Project Research paper No. 7*. USDI, Dept of the Interior, Bureau of Reclamation, Upper Colorado Region.
- Smith, Elmer R.
 1934 A Brief Description of an Indian Ruin Near Shunesburg, Utah. *Zion-Bryce Nature Notes*. Vol. 6, No.1. Zion National Park.
- Smith, Spence S.
 1990 Large Floods and Rapid Entrenchment Kanab Creek, Southern Utah. Master's thesis on file at the Graduate college, University of Arizona. Tucson.
- Spangler, Jerry
 2000 Class One Overview of the Grand Staircase-Escalante National Monument. On file Grand Staircase-Escalante National Monument. Kanab.

References

- Stallings, W.S.
1941 A Basketmaker II Date from Cave du Pont, Utah. *Tree-Ring Bulletin* 8 (1): 3-6.
- Steward, Julian H
1941 *Archaeological Reconnaissance of Southern Utah*. Bureau of American Ethnology Bulletin Vol. 128. Washington, D.C.
- Suhm, Dee Ann
1959 *Extended Survey of the Right Bank of Glenn Canyon In*, The Glen Canyon Archaeological Survey. University of Utah Anthropological Paper No.36, Salt Lake City.
- Talbot, Richard K.
1990 Virgin Anasazi Architecture: Toward A Broader Perspective. *Utah Archaeology* 1990 2:19-41.
1998 The Virgin Basketmaker Emergence. In Excavation / Mitigation Report Near Hildale, Utah 42WS2195,42Ws2196,Az B:1:35(BLM) (Reservoir Site) compiled by Asa S. Nielson. Baseline Data. Orem.
- Talbot, Richard K., Lane D. Richens, Shane A. Baker, and Joel Janetski
1999 *Broken Arrow Cave (42Ka4356):1997 Testing Results*. Prepared for the Kanab Field Office, Bureau of Land Management. Brigham Young University Museum of Peoples and Cultures Technical Series No. 99-5. Provo.
- Tabot, Richard K., Lane D. Richens, Shane A. Baker
2000 *Grand Staircase-Escalante National Monument Archaeological Survey and Testing Program: 1999 Inventory of the Upper Circle Cliffs Area*. Brigham Young University Museum of Peoples and Cultures Technical Series No. 99-11, Provo.
- Talbot, Richard K., Lane D. Richens, Aubrey Baadsgaard, Aaron Jordan, Katie Baker and Shane Baker
2002 *Archaeological Excavation at Deer Creek Shelter (42Ga3128)*. BYU Museum of Peoples and Cultures Technical Series No. 01-4. Prepared for Garfield County and the GSENM. Brigham Young University. Provo.
- Thompson, Richard A.
1979 *A Projection of Archeological Site Densities in the Slide Mountain, Tuckup Point, and Jensen Tank Areas of the Grand Canyon National Park*. Western Anasazi Reports Vol.2 , No. 3. Southern Utah State College.
1995 Analysis of ceramics collected during excavations at the Corngrower site, B:102: (BLM). Ceramic tabulations on file at the SUU Archaeological Repository, Cedar City.
- Thompson, Richard A. and Georgia Beth Thompson
1974 A Preliminary Report of Excavations in the Grand Canyon National Monument Sites:GC-670,GC-671, and GC-663. Submitted to the Grand Canyon National Monument. Museum of Southern Utah, Southern Utah State College, Cedar City.
1978 The Little Jug Site: 1976-1977. Ms. on file at Southern Utah State College. Cedar City.
1982 The Prehistory and Environment of Southwest Utah. Ms on file at Southern Utah University Museum. Intersearch.
- Thompson, Richard A., and Barbra A. Walling
1988 *Archeology of the Dead Raven Site*. Intersearch, Cedar City, Utah. Prepared for the Kane Co. Commission. Reprinted 2004 as Utah Cultural Resource Series No.26, Grand Staircase Special Publication No. 2., Kanab.

- Thompson, Richard A., Georgia Beth Thompson and Jessie Embry.
 1983 CLASS I CULTURAL RESOURCE INVENTORY FOR THE CEDAR CITY DISTRICT OF THE BUREAU OF LAND MANAGEMENT. On file Cedar City District, BLM.
- Tipps, Betsy L.
 1988 *The Tar Sands Project: An Inventory and Predictive Model for Central and Southern Utah*. P-III Associates Cultural Resources Series No.22. USDI Bureau of Land Management, Salt Lake City.
 1989 *Cultural Resource Investigations Near Kanab, Utah: Excavation and Structural Stabilization at Cottonwood Canyon Cliff Dwelling*. Cultural Resources Report 421-1-8821. Submitted to the USDI, Bureau of Land Management, Kanab Resource Area Office, Kanab, by P-III Associates, Salt Lake City.
 1991 The Burr Trail Archeological Project: Small Site Archeology On The Escalante Plateau and Circle Cliffs, Garfield County, Utah. P-III Associates, Inc. Submitted to the Bureau of Land Management Salt Lake City, Utah.
 1995 *Holocene Archaeology Near Squaw Butte, Canyonlands National Park, Utah*. Selections from the Division of Cultural Resources, Rocky Mt. Region. National Park Service.
- Tipps, Betsy L. and Nancy J. Hewitt
 1989 *Cultural Resource Inventory and Testing in the Salt Creek Pocket and Devils Lane Areas, Needles District, Canyonlands National Park, Utah*. Selections from the Division of Cultural Resources. Rocky Mountain Region, NPS.
- Turner, Christy G. II
 1971 Revised Dating For Early Rock Art of the Glen Canyon Region. *American Antiquity* 36:381-530.
- Valdez, Adela
 1993 Macrobotanical Analysis and Interpretation from 42Ka1568. Unpublished Master's Thesis on file at Department of Anthropology, University of California, Long Beach.
- Wade, William D.
 1967 Archaeological Investigations in Northwestern Arizona. Unpublished Ms. Museum of Northern Arizona. Flagstaff.
- Walling, Barbara A. and Richard A. Thompson
 1988 *South Creek: Excavations at 42Ws1712*. Western Anasazi Reports Vol.4, No. 1. Museum of Southern Utah, Southern Utah University. Cedar City.
 1996 The 1996 Southern Utah University Field School Excavations at 42Ws3119 in Washington County, Utah. Ms on file at Southern Utah University, Cedar City.
 2004 *Archeology of the Dead Raven Site*. Utah Cultural Resource Series No.26, Grand Staircase - Escalante national Monument Special Publication No.2. Utah BLM.
- Walling, Barbara A., Richard A. Thompson, Gardiner F. Dalley and Dennis G. Weder
 1986 *Excavations at Quail Creek*. Bureau of Land Management, Utah Cultural Resource Series No.20. Salt Lake City.

References

- Warren, Claude N., Martha Knack, and Elizabeth von Till Warren
1980 A Cultural Resource Overview for the Amargosa-Mohave Basin Planning Units. Cultural Resources Publications Anthropology-History. University of Nevada, Las Vegas. On file at California Desert District, Bureau of Land Management, California.
- Webb, Robert H., Spence S. Smith, V. Alexander S. McCord
1991 *Historic Channel Change of Kanab Creek, Southern Utah and Northern Arizona*. Grand Canyon Natural History Association Monograph Number 9.
- Westfall, Deborah A.
1985 *Archaeological Test Excavations at the Energy Fuels Nuclear, Inc. Vermilion Cliffs Project, Kane County, Utah*. Abajo Archaeology, Bluff, Utah. Report on file at the BLM Kanab Resource Area Office, Kanab, Utah.
1987a *THE PINENUT SITE: VIRGIN ANASAZI ARCHAEOLOGY ON THE KANAB PLATEAU OF NORTHWESTERN ARIZONA*. Cultural Resource Series Monograph No.4. Bureau of Land Management. Phoenix.
1987b *GREENSPRING:AN ANASAZI AND SOUTHERN PAUITE ENCAMPMENT IN THE ST.GEORGE BASIN OF UTAH*. Utah Cultural Resource Series No.21. Salt Lake City.
- Wilcox, David R.
1988 The Pinenut Site: Virgin Anasazi Archaeology on the Kanab Plateau of Northwestern Arizona (review). *Utah Archeology* 1988.
- Wiley, Gordon R. and Philip Phillips
1958 *Method and Theory in American Archaeology*. The University of Chicago Press. Chicago.
- Wilson, C.D., and E. Blinman
1993 Early Anasazi Ceramics and the Basketmaker Tradition. *Proceedings of the Anasazi Symposium 1991*, compiled by A.R. Hutchinson and J.E. Smith, pp.199-214. Cortez: Mesa Verde Museum Association.
- Wise, Karen E.
1986 *Prehistoric Settlement Patterns and Site Plans on Little Creek Mountain and the Western Anasazi Region*. Western Anasazi Reports. Vol.3, No.3. Cedar City.
- Zweifel, Matthew, Derinna V. Kopp, and Ronald Rood
2010 The Tommy Turf Site 42Ka6032: A Basketmaker II Burial from Kane County Utah. In: *Learning from the Land: Grand Staircase Escalante National Monument Science Symposium Proceedings 2006*, pp 298-311. Grand Staircase - Escalante National Monument, Utah.

APPENDIXES

APPENDIX A

Radiocarbon Dates Cedar City District and GSENM Bureau of Land Management

Compiled and edited by D. A. McFadden

Site No. Project/Collector	Lab No. Date	Material	Context/ Control	Conventional C14 Age (BP)	Cal Results 2 sigma (95%)	Intercept w/ cal. curve
Skutumpah Mammoth Exc.	Beta-135017	Bone collagen (-16.4)	SMS FS-1	11,390+/-40	BC 11,825-11,740 BC 11,530-11,205	BC 11,455
42Ka854	Beta-190929	wood twig (-25.8)	FS-1	1200±40	AD 710 to 910 AD 920 to 960	AD 810, 840, 860
42Ka877	Beta-190930	corn cob (-8.6)	FS-1	1280±90	AD 620 to 970	AD 710
42Ka878	Beta-190931	corn cob (-9.0)	FS-1	1160±50	AD 770 to 990	AD 890
42Ka879	Beta-190932	corn cob (-9.1)	FS-1	1510±60	AD 420 to 650	AD 560
42Ka1168	Beta-104596	6 kernels from cob (A) ; (-9.7)	Cist 30, Cave DuPont	SIR Raw date B.P. 1740	95%CI(BP) 1720-1540	1630 BP
42Ka1168	Beta-104597	6 kernels from cob B; (-9.4)	Cist 30, Cave DuPont	SIR Raw date B.P. 1770	95%CI (BP) 1810-1560	1690 BP
42Ka1248	Beta- 134475	wood (-21.1)	Juniper bark	860+/-100	AD 995 to 1300	AD 1195
42Ka1323	Beta 155678	Horn Flaker (-20.3) (bone collagen)	Tibbet Cave, surface	1030+/-40	AD 960 to 1040	AD 1010
42Ka1499	Beta- 132378	corn cob (-9.0)	Surface, assoc. w/ granary	1310+/-40	AD 655 to 780	AD 685
42KA1502(previo usly 1504)	Beta 107649	FS-1 corn cob (- 10.7)	sheltered camp	950+/-60	AD 695 to 995	AD 880

Site No. Project/Collector	Lab No. Date	Material	Context/ Control	Conventional C14 Age (BP)	Cal Results 2 sigma (95%)	Intercept w/ cal. curve
42KA1504	Beta 24402 1/12/88	Charcoal	Kiva Hearth	840+/-80	AD 1020 to 1295	AD 1220
42KA1504	Beta 26630 1988	Charcoal	PI Pithouse	1140+/-70	AD 720 to 735 760 to 1020	AD 895
42Ka1520	Beta- 134476	wood (-25.0)	Twig	950+/-70	AD 980 to 1235	AD 1040
42Ka1557	Beta- 132379	wood shaving (- 21.2)	Granary, door stop	980+/-40	AD 995 to 1160	AD 1025
42KA1568 (D. Larson; CSULB)	Beta 55076 5/93	Maize (+250 -10.0)	Room 1 fill	810+/-60	AD 1055 to 1090 1150 to 1295	AD 1245
42KA1568 (D. Larson; CSULB)	Beta 55077 5/93	Maize (+250 -9.6)	Room 1 fill	770+/-50	AD 1195 to 1300	AD 1270
42KA1568 (D. Larson; CSULB)	Beta 55078 5/93	Charcoal	Trench 3 "roof" material	790+/-50	AD 1175 to 1295	AD 1260
42KA1568 (D. Larson; CSULB)	Beta 55079 5/93	Charcoal	Trench 7 "roof" material	930+/-60	AD 1000 to 1245	AD 1055, 1090, 1150
42KA1568 (D. Larson; CSULB)	Beta 55080 5/93	Charcoal	Room 12 Beam	800+/-70	AD 1045 to 1105 1115 to 1300	AD 1250
42Ka1576	Beta-128986	corn cob AMS (-9.3)	Disturbed fill	1570+/-70	AD 350 to 635	AD465 AD480 AD520
42KA1576	RL-2086 12/6/88	Wood/Char.	Structural. timber	1670+/-110	AD 120 to 630	AD 405
42Ka1695	Beta-150671	Corn cob (-10.4)	FS1	1290±60	AD 650 to 880	AD 700
42KA1796	Beta-6284 2/28/83	Structural Charcoal	FS-30 (post)	1510+/-110	AD 340 to 705	AD 575

Site No. Project/Collector	Lab No. Date	Material	Context/ Control	Conventional C14 Age (BP)	Cal Results 2 sigma (95%)	Intercept w/ cal. curve
42KA1812	Beta 168673	Riparian twig	Room 2 roof matting	890+/-50	AD 1020 to 1260	AD 1170
42KA1819	Beta-161895 1/9/02	Corn Cob (-8.4)	FS-1	980+/-60	AD 970 to 1190	AD 1030
42KA1819	Beta-161896 1/9/02	Corn Cob (-9.8)	FS-2	1390+/-70	AD 540 to 770	AD 650
42KA1819	Beta-161897 1/9/02	Bark/rings (-21.1)	FS- 3 Kiva post	920+/-40	AD 1020 to 1210	AD 1060 AD1080 AD1150
42KA1969 (Kvamme and Nickens 1981)	RL-1396 1980	Charcoal	Open Hearth	990+/-110	AD 855 to 1270	AD 1025
42KA1969 (Kvamme and Nickens 1981)	RL-1397 1980	Charcoal	Pithouse Hearth	810+/-110	AD 1010 to 1400	AD 1245
42KA1969 (Kvamme and Nickens 1981)	RL-1398 1980	Charcoal	Early comp.	1460+/-120	AD 380 to 800	AD 620
42KA1969	Beta -157844 9/4/01	Bone collagen	Accession # 1604-12.	1170+/-40	AD 770 to 980	AD 880
42KA1969	Beta -157845	Bone collagen	Accession # 1603-64	1220+/-40	AD 690 to 900	AD 790
42KA1978 (Metcalf 1981)	UGa-3749 1982	Charcoal	Roof fall Struct. I	720+/-65	AD 1215 to 1400	AD 1285
42KA1978 (Metcalf 1981)	UGa-3750 1982	Charcoal	Hearth, Level II	1825+/-75	AD 50 to 400	AD 225
42KA1978 (Metcalf 1981)	UGa-3751 1982	Charcoal	Hearth, Level II	980+/-75	AD 905 to 920 950 to 1225	AD 1030

Site No. Project/Collector	Lab No. Date	Material	Context/ Control	Conventional C14 Age (BP)	Cal Results 2 sigma (95%)	Intercept w/ cal. curve
42KA1978 (Metcalf 1981)	UGa-4003 1982	Charcoal	Roof fall Level II	835+/-65	AD 1035 to 1290	AD 1225
42Ka2031	Beta-125910	corn cob(-8.5)	Surface	1220+/-70	AD 665 to 985	AD 800
42KA2147	Beta 6285 2/28/83	Charcoal	FS-18	1020+/-200	AD 645 to 1315 1345 to 1390	AD 1015
42Ka2189	Beta-128987	"yucca" fiber AMS (-11.5)	Strap on cached corrugated jar	1080+/-40	AD 885 to 1020	AD 980
42KA2574 (Schleisman and Neilson 1988)	Beta 8781 CA 1988	Carbon	Hearth I	1680+/-130	AD 75 to 645	AD 395
42KA2574 (Schleisman and Neilson 1988)	Beta 8782 CA 1988	Carbon	Burial 2	2530+/-110	BC 890 to 385	BC 775
42KA2574 (Schleisman and Neilson 1988)	Beta 8783 CA 1988	Carbon	Midden	1780+/-60	AD 110 to 420	AD 245
42KA2574 (Schleisman and Neilson 1988)	Beta 8784 CA 1988	Charred roof beam	Structure 1	1410+/-50	AD 575 to 690	AD 650
42KA2574 (Schleisman and Neilson 1988)	Beta 8785 CA 1988	Charred Roof Beam	Structure 1	1500+/-60	AD 430 to 660	AD 590
42Ka2580 (Westfall 1985)	Beta- 134477	corn cob (-9.8)	Surface	920+/-60	AD 1005 to 1250	AD 1055, 1085, 1150
42KA2584 (Westfall 1985)	Beta 8419 1984	Beam 7-9CM	Pit structure, F1 5.90N/7.80E	960+/-50	AD 995 to 1205	AD 1035
42KA2584 (Westfall 1985)	Beta 8420 1984	Burned beam	Pit structure, F1	840+/-50	AD 1045 to 1105 AD 1115 to 1280	AD 1220
42KA2594 (Westfall 1985)	Beta 8422 1984	Carbon	F1 Cist fill	1130+/-120	AD 665 to 1175	AD 905, 920, 950

Site No. Project/Collector	Lab No. Date	Material	Context/ Control	Conventional C14 Age (BP)	Cal Results 2 sigma (95%)	Intercept w/ cal. curve
42KA2594 (Westfall 1985)	Beta 8423 1984	Carbon	F4 hearth in midden	1100+/-50	AD 865 to 1020	AD 975
42KA2605 (Westfall 1985)	Beta 8421 1984	Charcoal	F1A hearth	640+/-60	AD 1275 to 1420	AD 1310, 1365, 1375
42KA2610	Beta 10844 11/13/84	Charcoal	FS-6	1940+/-70	BC 60 to AD240	AD 75
42KA2664	Beta 23056 10/17/87	Charcoal	CS-420 F3 Burial	1080+/-140	AD 665 to 1250	AD 985
42KA2667 (Walling and Thompson 1988)	Beta 23053 10/17/87	Charcoal	F40 Workroom	1690+/-80	AD 160 to 555	AD 390
42KA2667 (Walling and Thompson 1988)	Beta 23054 10/17/87	Charcoal	F14 PH-1, Floor	1120+/-70	AD 775 to 1030	AD 960
42KA2667 (Walling and Thompson 1988)	Beta 23055 10/17/87	Charcoal	F59 PH-1, Hearth	1010+/-60	AD 905 to 920 AD 950 to 1175	AD 1020
42Ka2683	Beta- 132380	corn cob (-9.8)	Surface	1060+/-60	AD 875 to 1040	AD 995
42KA2780	Beta 16079 4/30/86	Ext. Ring Str. Tim.	FS-7	1610+/-60	AD 340 to 600	AD 435
42KA2780	Beta 16080 4/30/86	Ext. Ring Str. Tim.	FS-37	1660+/-90	AD 210 to 605	AD 410
42KA2780	Beta 157843 9/4/01	Bone collagen	FS-36, pithouse fill	1390+/-40	AD 610 to 690	AD 650
42Ka3061	Beta-121576	riparian wood (27.9)	Twig from structure	1380+/-80	AD 550 to 800	AD 660
42KA3328	Beta 40331 11/30/90	Charcoal	F4 Floor Contact	810+/-60	AD 1055 to 1090 AD 1150 to 1295	AD 1245

Site No. Project/Collector	Lab No. Date	Material	Context/ Control	Conventional C14 Age (BP)	Cal Results 2 sigma (95%)	Intercept w/ cal. curve
42KA3360	RL-2084 12/6/88	Charcoal	Potted Room	1270+/-110	AD 600 to 1000	AD 770
42KA3383	Beta 132381	corn cob (-9.4)	Surface	900+/-70	AD 1005 to 1270	AD 1160
42KA3383	Beta 132382	corn cob(-10.3)	Surface	960+/-50	AD 995 to 1195	AD 1035
42KA3494 (Firor 1994)	Beta 64997 3/94	Charcoal	Hearth	730+/-60	AD 1215 to 1325 AD 1340 to 1390	AD 1285
42KA3494 (Firor 1994)	Beta 64998 3/94	Charcoal	Hearth	600+/-80	AD 1275 to 1450	AD 1395
42KA3494 (Firor 1994)	Beta 64999 3/94	Charcoal	Hearth	710+/-50	AD 1245 to 1325 AD 1340 to 1390	AD 1290
42KA3494 (Firor 1994)	Beta 65000 3/94	Charcoal	Hearth	100+/-50	AD 1670 to 1780 AD 1795 to 1945	AD 1890, 1905
42KA3494 (Firor 1994)	Beta 65001 3/94	Charcoal	Hearth	700+/-50	AD 1250 to 1395	AD 1290
42KA3494 (Firor 1994)	Beta 65002 3/94	Charcoal	Hearth	510+/-50	AD 1325 to 1340 AD 1390 to 1460	AD 1425
42KA3494 (Firor 1994)	Beta 65003 3/94	Charcoal	Hearth	340+/-60	AD 1440 to 1665	AD 1520, 1570, 1630
42KA3495 (Firor 1994)	Beta 65004 3/94	Charcoal	Hearth	700+/-70	AD 1220 to 1410	AD 1290
42KA3575	Beta 140952	Corn cob (-9)	Cist #2	1790+/-70	AD 75 to 410	AD 240
42KA3576	Beta 40332 11/90	Wood	BM II Burial	1890+/-60	AD 5 to 250	AD 120

Site No. Project/Collector	Lab No. Date	Material	Context/ Control	Conventional C14 Age (BP)	Cal Results 2 sigma (95%)	Intercept w/ cal. curve
42KA3684	Beta 140953	Corn cob	Disturbed surface	?	AD 135 to 540	AD 365
42KA3694	Beta 163063 2/4/02	wood (-24.7)	twig in adobe matrix	780+/-70	AD1060 to 1080 AD1150 to 1300	AD 1260
42Ka3831 , (McFadden 2007)	Beta 243765	Bone collagen (-8.5) (AMS, R. Rood)	L.PII burial; Tsegi Orange Ware, corrugated assoc.	920+/-40	AD 1020-1210	AD1060,1080, 1150
42KA3976	Beta 66334 11/94	Charcoal (-25.0)	F14 Hearth	1020+/-50	AD 960 to 1065 AD 1075 to 1155	AD 1015
42KA3976	Beta 66335 11/94	Charcoal (-25.0)	F7 surface	860+/-50	AD 1035 to 1275	AD 1205
42KA3976	Beta 77109 11/94	Charcoal (-25.0)	F34 West surface	3370+/-80	BC 1880 to 1450	BC 1660
42KA3976	Beta 77110 11/94	Charcoal (-25.0)	F7	950+/-60	AD 990 to 1225	AD 1040
42KA3976	Beta 77111 11/94	Charcoal (-25.0)	F11	1150+/-70	AD 705 to 1020	AD 890
42KA3976	Beta 77112 11/94	Charcoal (-25.0)	F40	760+/-60	AD 1180 to 1310 AD 1365 to 1375	AD 1275
42KA3976	Beta 77113 11/94	Charcoal (-25.0)	F3	1020+/-50	AD 960 to 1065 AD 1075 to 1155	AD 1015
42KA3976	Beta 77114 11/94	Charcoal (-25.0)	F32	1110+/-70	AD 780 to 1035	AD 970
42KA3976	Beta 77115 11/94	Charcoal (-25.0)	F10	700+/-50	AD 1250 to 1395	AD 1290

Site No. Project/Collector	Lab No. Date	Material	Context/ Control	Conventional C14 Age (BP)	Cal Results 2 sigma (95%)	Intercept w/ cal. curve
42KA3976	Beta 77116 11/94	Charcoal (-25.0)	F20	840+/-50	AD 1045 to 1105 AD 1115 to 1280	AD 1220
42KA3976	Beta 77117 11/94	Charcoal (-25.0)	F9, good quality, small twigs	820+/-60	AD 1045 to 1105 AD 1115 to 1290	AD 1235
42KA3976	Beta 77118 11/94	Charcoal(-25.0)	F21 Hearth, East side	3420+/-90	BC 1935 to 1505	BC 1705
42KA3976	Beta 100262	Corn cob (-13.7)	F3 fill	870+/-80	AD 1010 to 1290	AD 1195
42KA3976	Beta-117940	charred corn kernel (AMS) (-10.)	F14 hearth in F3	800+/-30	AD 1205 to 1280	AD1250
42KA3976	Beta-117941	charred maize kernel (AMS) (9.2)	F32 hearth in F11	850+/-30	AD 1165 to 1260	AD1215
42KA4280	Beta-125911	? (23.6)	?	1450+/-40	AD 555 to 665	AD 630
42KA4280	Beta-131667	Charred corn (11.2)	F1 (upper) pithouse hearth	1240+/-40	AD 680 to 885	AD 775
42Ka4309	Beta-194328	Corn Husk frag In mortar (-12.3)	FS-1	1340+/-40	AD 640 to 770	AD 670
42Ka4356 (Talbot et al.1999)	Beta- 111634	(25.7) Charcoal	FS-44	2000+/-70	BC 175 to AD 145	AD 15
42Ka4356 (Talbot et al.1999)	Beta- 111635	(22.5) Charcoal	FS-221	6640+/-80	BC 5635 to 5425	BC 5530
42KA4356 (Talbot et al.1999)	Beta- 111636	(11.9)charcoal	FS-289	6660+/-80	BC 5665 to 5435	BC 5570
42KA4356 (Talbot et al.1999)	Beta- 111637	(31.1)charcoal	FS-314	7290+/-70	BC 6215 to 5980	BC 6125

Site No. Project/Collector	Lab No. Date	Material	Context/ Control	Conventional C14 Age (BP)	Cal Results 2 sigma (95%)	Intercept w/ cal. curve
42KA4356 (Talbot et al. 1999)	Beta- 111638	(13.0)vegetative	FS-398	6700+/-80	BC 5690 to 5445	BC 5585
42KA4356 (Talbot et al. 1999)	Beta- 111639	(22.8)charcoal	FS-399	1520+/-90	AD 380 to 675	AD 560
42KA4416	Beta 107650	FS-1 corn cob (-10.5)	Fremont granary	890+/-60	AD 780 to 1020	AD 905, 920, 950
42Ka4478 (Nash 2013)	Beta 252928	charcoal	Cist (F8)	1670+/-40	AD 260-300 AD 310-430	AD 390
42Ka4478 (Nash 2013)	Beta 252929	charcoal	Hearth 2 (F9)	1570+/-40	AD 410-580	AD 450, 460, 480, 530
42Ka4535	Beta-121577	corn cob (10.5)	surface	1390+/-60	AD 575 to 770	AD 635
42Ka4547 (Geib et al. 2001)	Beta-144228	Charcoal (-21.2)	Shallow Basin Hearth (F1)	2200±40	BC 380 to 165	BC 350, 310, 210
42Ka4552 (Geib et al. 2001)	Beta-144229	Twig (-22.2)	Lower fill of midden (F1)	3930±30	BC 2480 to 2330	BC 2460
42Ka4552 (Geib et al. 2001)	Beta-144230	Charcoal (-25.0)	Slab-lined Hearth (F4)	1730±50	AD 215 to 420	AD 330
42Ka4575 (Geib et al. 2001)	Beta-144225	Bark (-21.9)	Bottom of Shallow Basin Hearth (F1)	400±40	AD 1430 to 1525 AD 1560 to 1630	AD 1460
42Ka4655 (Geib et al. 2001)	Beta-144226	Charred juniper berries (-21.0)	hearth	1680+/-40	AD 255 to 435	AD 390
42Ka4662 (Geib et al. 2001)	Beta-144224	Bone Collagen (-20.0)	Next to Hearth (F2) in a test unit	80±40	AD 1680 to 1745 AD 1805 to 1935 AD 1945 to 1955	AD 1950

Site No. Project/Collector	Lab No. Date	Material	Context/ Control	Conventional C14 Age (BP)	Cal Results 2 sigma (95%)	Intercept w/ cal. curve
42Ka4749 (Geib et al. 2001)	Beta-144226	Juniper seeds (-21.0)	Upper fill (F1) of basin hearth (F6) in test unit	1680±40	AD 255 to 435	AD 390
42Ka4750 (Geib et al. 2001)	Beta-144227	Juniper seed (-21.8)	Buried cultural stratum (F6) in test unit	880±40	AD 1035 to 1250	AD 1175
42Ka4794 (Geib et al. 2001)	Beta 155679	Arrow Shaft (reed) (-24.8)	Rose Shelter	860+/-40	AD 1040 to 1260	AD 1190
42Ka4859	Beta 167437	Charred Material (-25.0)	FS 71	1540±80	AD 370 to 660	AD 540
42Ka4859	Beta 167438	Charred Material (-25.0)	FS 105	1330±80	AD 580 to 880	AD 680
42Ka4859	Beta 167439	Charred Material (-20.9)	FS 96	2010±40	BC 100 to AD 70	BC 10
42Ka4859	Beta 167440	Charred Material (-23.2)	FS 184	1910±40	AD 20 to 220	AD 90
42Ka4859	Beta 167441	Charred Material (-25.0)	FS 205	1480±60	AD 430 to 660	AD 600
42Ka4859	Beta 167442	Charred Material (-25.0)	FS 204	1400±80	AD 530 to 780	AD 650
42Ka4859	Beta 167443	Charred Material (-25.0)	FS 153	1210±70	AD 670 to 990	AD 790
42Ka4859	Beta 167444	Charred Material (-25.0)	FS 214	1400±60	AD 550 to 710	AD 650
42Ka4859	Beta 179630	Seed (-10.8)	F40 in F37	1230±40	AD 690 to 890	AD 780
42Ka4859	Beta 179631	Seed (-10.3)	F25 in F11	1340±40	AD 640 to 770	AD 670
42Ka4859	Beta 179632	Seed (-11.6)	F21 in F15	1300±40	AD 660 to 790	AD 690
42Ka4859	Beta 179633	Seed (-10.9)	F12	1300±40	AD 660 to 790	AD 690

Site No. Project/Collector	Lab No. Date	Material	Context/ Control	Conventional C14 Age (BP)	Cal Results 2 sigma (95%)	Intercept w/ cal. curve
42Ka4860	Beta- 134478	wood (-24.3)	Twig in adobe	1200+/-40	AD 705 to 910 AD 920 to 955	AD 815, 840, 855
42Ka4865	Beta- 132383	wood twig (- 23.8)	Wall peg	780+/-70	AD 1055 to 1085 AD 1150 to 1305	AD 1260
42Ka4876	Beta- 134479	corn (-13.6)	Surface	880+/-40	AD 1035 to 1250	AD 1175
42Ka5058	Beta-140951	twigs	Adobe matrix	1250+/-70	AD 655 to 965	AD 770
42Ka5153	Beta-146080	charcoal (-12.1)	Buried hearth profile	1590+/-40	AD 400 to 560	AD 440
42Ka5363	Beta-191066	wood twig (-23.1)	FS-1	140±40	AD 1660 to 1950	AD 1680, 1730, 1810, 1930, 1950
42Ka5609	Beta-150670	corn cob (-10.6)	FS-1	1110±80	AD 770 to 1040	AD 970
42Ka5628	Beta-150668	grass (-21.5)	FS-1	450+/-70	AD 1400 to 1530 AD 1550 to 1630	AD 1440
42Ka5628	Beta-150669	corn cob (-10.8)	FS-2	960±70	AD 970 to 1230	AD 1030
42Ka5902	Beta-190933	corn cob (-9.2)	FS-1	1440±50	AD 540 to 670	AD 630
42Ka5902	Beta-190934	corn cob (-9.3)	FS-2	1230±50	AD 680 to 900	AD 780
42KA6032 (Zweifel et al. 2010)	Beta - 222449	Bone collagen (-7.3)	AS73 F2 pit?	2060+/-60	BC200 to AD 70	BC 50
42KA6032 (Zweifel et al. 2010)	Beta - 222450	Bone collagen (-7.9)	AS76 F2 pit?	2040+/-40	BC 160 to AD 50	BC 40
42Ka6043	Beta-202621	corn cob (-9.1)	FS-1	1960+/-50	BC 50 to AD 130	AD 50
42Ka6293 (Nash 2013)	Beta-252924	Charred beam	Ramada (F2)	1460+/-40	AD 540-650	AD 610

Site No. Project/Collector	Lab No. Date	Material	Context/ Control	Conventional C14 Age (BP)	Cal Results 2 sigma (95%)	Intercept w/ cal. curve
42Ka6293 (Nash 2013)	Beta-252925	charcoal	Cist 2 (F4)	1340+/-40	AD 640-720 AD 740-770	AD 660
42Ka6293 (Nash 2013)	Beta-252926	Charred corn cob	Ramada (F2)	1170+/-40	AD 770-980	AD 880
42Ka6293 (Nash 2013)	Beta-252927	Charred corn cob	Roasting Pit 3 (F7)	1340+/-40	AD 640-720 AD 740-770	AD 660
42Ka554/6941	Beta-358240	Wood (-22.3)	FS-1	890+/-30	AD 1040-1110, AD 1120-1220	AD 1160
42Ka554/6941	Beta-358241	Wood (-24.1)	FS-2	860+/-30	AD1050-1080 1130-1130 1150-1230 1230-1240 1250-1250	AD 1190 AD 1200 AD 1210
42Ka554/6941	Beta-358242	Wood (-25.3)	FS-3	900+/-30	AD 1030-1220	AD 1160
42Ka7151	Beta-317153	Wood (-24.7)	FS-1	1250+/-30	AD 680-830 AD 840-870	AD 730, 740, 770
42Ka7165	Beta-346332	Maize (-9.8)	FS-1	960+/-30	AD 1020-1160	AD 1030
42Ka7192	Beta-328998	Wood (-23.1)	FS-1	1120+/-30	AD 880-990	AD 900, 920, 940
42Ka7714	Beta-380906	Charred (-21.6)	Feature A, roast	1040+/-30	AD 970 - 1025	AD 1015
42Ka7715	Beta-380907	Charred (-23.6)	Slab feature	1740+/-30	AD 235 - 385	AD 260, 280, 325
42Ka8053	Beta-416382	cf. rabbitbrush -23.8	Granary mortar	1170+/-30	AD 770-905 AD 920-965	AD 885

Site No. Project/Collector	Lab No. Date	Material	Context/ Control	Conventional C14 Age (BP)	Cal Results 2 sigma (95%)	Intercept w/ cal. curve
AZ C: 1:17 (BLM)	Beta-260648	Corn cob (-11.7)	pack rat midden	790+/-40	AD 1170-1280	AD 1260
42GA43 (Janetski et al. 2012)	Beta-171922	Zea mays	Structure 1 vent	660+/-80	AD 1220-1427	-
42Ga882	Beta-165413	corn cob (-10.1)	FS-1	950+/-60	AD 990 to 1220	AD 1040
42Ga882	Beta-165414	corn cob (-9.9)	FS-2	1080+/-80	AD 780 to 1060 AD 1080 to 1150	AD 980
42Ga1541	Beta- 134608	corn cob (-9.5)	Surface	1230+/-60	AD 670 to 965	AD 780
42Ga1541	Beta- 134609	corn cob (-9.9)	Surface	1030+/-70	AD 880 to 1170	AD 1005
42GA1585 (Janetski et al. 2012)	Beta-171923	charcoal	Structure 1	1010+/-40	AD 978-1155	-
42GA2557 (Tipps 1988)	Beta 7705	Charcoal	Aceramic Pithouse	1700+/-60	AD 225 to 465 AD 475 to 515	AD 380
42Ga3750	Beta-117938	uncharred corn cob (-11.2)	F25 Collected by BYU from granaries	1200+/-80	AD 665 to 1005	AD 865
42Ga2672 Lampstand (pueblo)	Beta-117939	charred corn cob (-12.8)	F34 Test exc. In rm__	960+/-60	AD 985 to 1220	AD 1035
42GA3102 (Jacklin 1988)	Beta 17182	?	square structure	1200+/-60	AD 687 to 989*	AD 895
42GA3122 (Tipps 1991)	Beta 20669 5/1/87	Charcoal	Hearth Lng Canyon	2250+/-70	BC 405 to 115	BC 365
42GA3123 (Tipps 1991)	Beta 20670 5/1/87	Charcoal	Hearth	770+/-70	AD 1165 to 1310 AD 1355 to 1385	AD 1270
42GA3128 (Talbot et al. 2002)	CAMS-74936 4/18/01	pine cone scale	slab-lined feature F567 (Occ.2)	1,180+/-40	AD 722- 977	-

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42GA3128 (Talbot et al. 2002)	CAMS-74937	Pine cone scale	ash lens F553 (Occ.1)	1,460+/-40	AD 537-659	-
42GA3128 (Talbot et al. 2002)	CAMS-74938	Corn Cob	F11 in F7, 108N 103E FS200 (Occ.3)	860+/-40	AD 1160-1221	-
42GA3128 (Talbot et al. 2002)	CAMS-74939	Corn cob	107W 103E, F18 in F7 in F3; FS 435. (Occ.2)	890+/-30	AD1058-1210	-
42GA3132 (Tipps 1991)	Beta 20671 5/1/87	Charcoal	Pithouse	1550+/-60	AD 405 to 640	AD 540
42GA3132 (Tipps 1991)	Beta 35560 3/91	Charcoal	Pithouse	1580+/-60	AD 380 to 620	AD 465, 475, 515
42GA3138 (Tipps 1991)	Beta 20673 5/1/87	Charcoal	Hearth 5, Rock Shelter Stratum 4	770+/-60	AD 1175 to 1305	AD 1270
42GA3138 (Tipps 1991)	Beta 35318 3/91	Charcoal	Rock Shelter Stratum 3	1380+/-70	AD 560 to 785	AD 660
42GA3138 (Tipps 1991)	Beta 35319 3/91	Charcoal	Rock Shelter Stratum 2	2760+/-100	BC 1145 to 785	BC 900
42GA3138 (Tipps 1991)	Beta 39256 3/91	Charcoal	Rock Shelter Stratum 2	2320+/-60	BC 505 to 330 BC 330 to 205	BC 390
42GA3244 (Jacklin 1988)	Beta 22453	charcoal	Wall post in jacal structure	750+/-70	AD1213 to 1410*	AD 1290
42GA3244 Jacklin 1988)	Beta 22454	charcoal	Floor of jacal structure	790+/-50	AD1159 to 1294*	AD 1261
42GA3591	Beta 54183 7/5/92	Charcoal	Looted Cist	2040+/-50	BC 175 to AD 75	BC 35
42GA3660	Beta 93852 5/2/96	Charcoal	FS-7 Structure	1160+/-60	AD 720 to 735 AD 760 to 1005	AD 885

Site No. Project/Collector	Lab No. Date	Material	Context/ Control	Conventional C14 Age (BP)	Cal Results 2 sigma (95%)	Intercept w/ cal. curve
42GA3743	Beta 23057 10/17/87	Charcoal	F2 Hearth	1910+/-160	BC 355 to BC290 BC 230 to AD450	AD 100
42GA3743	Beta 23058 10/17/87	Charcoal	F3 Hearth	1500+/-140	AD 245 to 800	AD 590
42Ga3800	Beta-125908	(-25.0) charcoal	Buried strata Sevier River	4150+/-60	BC 2895 to 2560 BC 2525 to 2500	BC 2860 BC 2560 BC 2680
42GA3891 (BYU) (Jordan and Talbot (Ed) 2002)	Beta-159900	(AMS) maize	The Outpost Structure 1 vent shaft	1030+/-40	AD 960-1040	N.A.
42GA3907	Beta 93853	Wood	FS -1granary	1090+/-50	AD 875 to 1025	AD 980
42GA4086 Jordan and Talbot (Ed) 2002	Beta-159902	charcoal	Dos Casas Structure 1 hearth	1630+/-80	AD 420-610	N.A.
42Ga4086 Jordan and Talbot (Ed) 2002	Beta-159901	Charcoal	Dos Casas Structure 2, Pit 1	1010+/-50	AD 960-1160	N.A.
42Ga4086 Jordan and Talbot (Ed) 2002	Beta- 159903	charcoal	Dos Casas Activity area 2, hearth	1780+/-60	AD 240-610	N.A.
42GA4095 Jordan and Talbot (Ed) 2002	Beta-159904	charcoal	Roadcut Structure 1, posthole	1250+/-60	AD 660-900	N.A.
42GA4126	Beta 106104	Wood	F2, granary	1140+/-60	AD 775 to 1015	AD 895
42GA4158	Beta 107648	FS-1skewered corn cob (-9.1)	sheltered camp	980+/-80	AD 650 to 985	AD 785

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42GA4167 (Janetski et al. 2012)	Beta-171924	charcoal	Structure 1 fill	940+/-70	AD 1020-1205	-
42Ga4536	Beta- 134612	corn cob (-10)	Surface	1760+/-80	AD 80 to 435	AD 255
42Ga4507	Beta-125909	corn cob (-8.4)	Surface artifact	1070+/-70	AD855 to1055 and AD1090 to1150	AD 990
42Ga4518	Beta- 134610	corn cob (-8.7)	Surface	950+/-80	AD 965 to 1255	AD 1040
42Ga4521	Beta- 134611	corn cob (-10.1)	Surface	1610+/-120	AD 140 to 660	AD 430
42Ga4538	Beta- 134613	corn cob (-9.7)	Surface	1490+/-70	AD 420 to 670	AD 585
42Ga4540	Beta- 134614	corn cob (-10.6)	Surface	1610+/-40	AD 385 to 545	AD 430
42Ga4542	Beta- 134615	corn cob (-10.4)	Surface	1650+/-70	AD 240 to 560	AD 410
42Ga4543	Beta- 134616	corn cob (-9.8)	Surface	1590+/-80	AD 260 to 635	AD 440
42Ga4561	Beta- 134617	corn cob (-9.6)	Surface	1520+/-80	AD 390 to 665	AD 550
42Ga4561	Beta- 134618	corn cob (-9.9)	Surface	1500+/-80	AD 405 to 670	AD 570
42Ga4561	Beta- 134619	corn cob (-9.6)	Surface	1320+/-70	AD 615 to 875	AD 680
42Ga4655	Beta- 140954	corn cob (-9.6)	Surface	1580+/-40	AD 405 to 570	AD 445
42Ga5088 (Schaub 2003)	Beta-179652	charcoal	Slab-lined pit	1290+/-50	AD 650-870	-
42Ga5167 (Harris 2005)	Beta-255667	sediment	Structure fill	1550+/-40	AD 420 to 600	NA
42Ga____ Escalante Canyon Alcove (R. Talbot 4/15/03)	Beta-177171	Maize cob	surface	1070+/-60	"About" AD 870-1040	-

Site No. Project/Collector	Lab No. Date	Material	Context/ Control	Conventional C14 Age (BP)	Cal Results 2 sigma (95%)	Intercept w/ cal. curve
42WS250 (Walling et al. 1986)	Beta 8027 12/12/83	Charcoal	Charcoal lens	110+/-50	AD 1670 to 1950	AD 1825, 1835, 1880, 1915
42WS251 (Walling et al. 1986)	Beta 8028 12/12/83	Charcoal	Hearth	Modern	AD to	
42WS260 (Walling et al. 1986)	Beta 8029 12/12/83	Charcoal	Hearth	670+/-50	AD 1270 to 1405	AD 1300
42WS263 (Walling et al. 1986)	Beta 8030 12/12/83	Charcoal	Hearth 1	Modern	AD to	
42WS267 (Walling et al. 1986)	Beta 8031 12/12/83	Charcoal	Hearth 2	Modern	AD to	
42WS268 (Walling et al. 1986)	Beta 8471 12/12/83	Charcoal	Pithouse Fill 1	730+/-50	AD 1225 to 1310 AD 1355 to 1385	AD 1285
42WS268 (Walling et al. 1986)	Beta 8470 12/12/83	Charcoal	Cist 2, floor	1010+/-70	AD 890 to 1195	AD 1020
42WS274 (Walling et al. 1986)	Beta 8032 12/12/83	Charcoal	Char. Str.	Modern		
42WS275 (Walling et al. 1986)	Beta 8033 12/12/83	Charcoal	Hearth	Modern		
42WS280 (Walling et al. 1986)	Beta 8034 12/12/83	Charcoal	Hearth 1	200+/-50	AD 1640 to 1890 AD 1905 to 1950	AD 1670, 1780, 1795, 1945
42WS288 (Walling et al. 1986)	Beta 8035 12/12/83	Charcoal	Rm 6 Fill 1	750+/-60	AD 1195 to 1310 AD 1355 to 1385	AD 1275
42WS288 (Walling et al. 1986)	Beta 8036 12/12/83	Charcoal	Rm 1, fill 1	1020+/-50	AD 960 to 1065 AD 1075 to 1155	AD 1015
42WS288 (Walling et al. 1986)	Beta 8037 12/12/83	Charcoal	Roasting Pit, fill	890+/-50	AD 1025 to 1260	AD 1175

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42WS288 (Walling et al. 1986)	Beta 8038 12/12/83	Charcoal	Pithouse fill 1	1090+/-50	AD 875 to 1025	AD 980
42WS321 (Walling et al. 1986)	Beta 8472 12/12/83	Charcoal	Locus 4 hearth	1870+/-60	AD 25 to 265 AD 290 to 320	AD 135
42WS324	Beta 21475 7/15/87	Carbon	Historic hearth	100.3+/-0.6 Modern		
42WS326	Beta 21476 7/15/87	Carbon	F6	1760+/-160	BC 60 to AD 635	260
42WS326	Beta 21477 7/15/87	Carbon	F33 pithouse post	1830+/-60	AD 70 to 370	220
42WS326	Beta 21481 7/15/87	Carbon	F33 Post pithouse	1620+/-90	AD 240 to 635	430
42WS329	Beta 21482 7/15/87	Carbon	Test pit hearth	2790+/-170	BC 1405 to 515	BC 915
42WS329	Beta 21483 7/15/87	Carbon	Rock-lined hearth	2730+/-390	BC 1870 to 1830 BC 1780 to AD70	BC 845
42WS360	Beta 33236 10/11/89	Carbon	F44 Clay hearth	990+/-60	AD 970 to 1195	AD 1025
42WS360	Beta 33237 10/11/89	Carbon	F8 Floor Pit Structure	1070+/-60	AD 875 to 1040	AD 990
42WS360 Santa Clara River BLM	RL 2082 12/6/88	Carbon	CS88-1	940+/-110	AD 885 to 1285	AD 1045, 1105, 1115
42WS385 (Walling et al. 1986)	Beta 8039 12/12/83	Carbon	Cist 3, fill	1240+/-60	AD 665 to 960	AD 785
42WS386 (Walling et al. 1986)	Beta 8040 12/12/83	Carbon	Roasting pit fill	1050+/-70	AD 875 to 1165	AD 1000

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42WS387 (Walling et al. 1986)	Beta 8073 12/12/83	Carbon	Pithouse, Use dep.	1310+/-60	AD 640 to 875	AD 690
42WS387 (Walling et al. 1986)	Beta 8474 1986	Carbon	Pithouse hearth	980+/-50	AD 985 to 1180	AD 1030
42WS387 (Walling et al. 1986)	Beta 8475 1986	Carbon	Pithouse, floor	1160+/-60	AD 720 to 735 AD 760 to 1005	AD 885
42WS388 (Walling et al. 1986)	Beta 8041 12/12/83	Charcoal	Pithouse 2 Brnt Beam	1630+/-130	AD 120 to 665	AD 425
42WS388 (Walling et al. 1986)	Beta 8042 12/12/83	Carbon	Pithouse 2 Brnt Beam	1140+/-50	AD 785 to 1005	AD 895
42WS388 (Walling et al. 1986)	Beta 8043 12/12/83	Charcoal	Cist 5. Burnt Beam	2690+/-280	BC 1510 to 165	BC 825
42WS388 (Walling et al. 1986)	Beta 8044 12/12/83	Charcoal	Roasting pit fill	1870+/-60	AD 25 to 265 AD 290 to 320	AD 135
42WS388 (Walling et al. 1986)	Beta 8045 12/12/83	Carbon	Cist 4, beam	1170+/-60	AD 705 to 1000	AD 885
42WS389 (Walling et al. 1986)	Beta 8046 12/12/83	Charcoal	Hearth 1	Modern	AD to	
42WS390 (Walling et al. 1986)	Beta 8047 12/12/83	Charcoal	Strg Rm, fill 1	1800+/-330	BC 525 to AD 895	AD 240
42WS390 (Walling et al. 1986)	Beta 8048 12/12/83	Charcoal	Pithouse, burnt beam	570+/-60	AD 1295 to 1445	AD 1405
42WS392 (Walling et al. 1986)	Beta 8049 12/12/83	Charcoal	Pithouse, fill 1	1340+/-60	AD 620 to 800	AD 675
42WS392 (Walling et al. 1986)	Beta 8050 12/12/83	Charcoal	Pithouse, floor 1, slab vault	1070+/-60	AD 875 to 1040	AD 990

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42WS392 (Walling et al. 1986)	Beta 8476 1986	Charcoal	Isolated hearth 2	730+/-60	AD 1215 to 1325 AD 1340 to 1390	AD 1285
42WS392 (Walling et al. 1986)	Beta 8477 1986	Charcoal	Structure 2, burnt beam	840+/-50	AD 1045 to 1105 AD 1115 to 1280	AD 1220
42WS395 (Walling et al. 1986)	Beta 8051 12/12/83	Charcoal	Roomblock 1, Room 1, Fill 1	920+/-50	AD 1015 to 1235	AD 1065, 1075, 1155
42WS395 (Walling et al. 1986)	Beta 8052 12/12/83	Charcoal	Pithouse 1 floor	1050+/-60	AD 885 to 1055 AD 1090 to 1150	AD 1000
42WS395 (Walling et al. 1986)	Beta 8053 12/12/83	Charcoal	Roomblock 1, Room 2, ash	680+/-80	AD 1220 to 1420	AD 1295
42WS395 (Walling et al. 1986)	Beta 8054 12/12/83	Charcoal	Roomblock 1 Room 2, fill 1	780+/-60	AD 1170 to 1300	AD 1265
42WS395 (Walling et al. 1986)	Beta 8055 12/12/83	Charcoal	Rock shelter 2 hearth 6	780+/-50	AD 1180 to 1295	AD 1265
42WS404 (Dalley and McFadden 1988)	Beta 8323	Charcoal	F65 fill	1110+/-50	AD 855 to 1020	AD 970
42WS404 (Dalley and McFadden 1988)	Beta 23049 10/17/87	Charcoal	F66 fill	1060+/-70	AD 865 to 1065 AD 1075 to 1155	AD 995
42WS503 (Dalley and McFadden 1985)	Beta 6288 2/28/83	Charcoal	FS-261	1380+/-70	AD 560 to 785	AD 660
42WS503 (Dalley and McFadden 1985)	Beta 6289 2/28/83	Charcoal	FS-384	1120+/-50	AD 800 to 1015	AD 960
42WS503 (Dalley and McFadden 1985)	Beta 7351 4/30/86	Charcoal	F98 fill	1480+/-60	AD 440 to 665	AD 605

Site No. Project/Collector	Lab No. Date	Material	Context/ Control	Conventional C14 Age (BP)	Cal Results 2 sigma (95%)	Intercept w/ cal. curve
42WS503 (Dalley and McFadden 1985)		Charcoal	West midden	810+/-90	AD 1025 to 1310 AD 1355 to 1385	AD 1245
42WS881 Little Creek Mt	Beta 40333 11/13/90	Charcoal	F41C	870+/-70	AD 1020 to 1285	AD 1195
42WS920 Little Creek Mt	Beta 18538 12/2/86	Charcoal	F50	990+/-80	AD 890 to 1225	AD 1025
42WS920 Little Creek Mt	Beta 18539 12/2/86	Charcoal	F71 "Kiva"	1130+/-70	AD 770 to 1025	AD 905, 920, 950
42WS920 Little Creek Mt	Beta 18540 12/2/86	Charcoal	F59	950+/-60	AD 990 to 1225	AD 1040
42WS920 Little Creek Mt	Beta 18541 12/2/86	Charcoal	F148	1140+/-60	AD 775 to 1015	AD 895
42WS920 Little Creek Mt	RL 2083 12/6/88	Charcoal	Structural timber	950+/-110	AD 885 to 1285	AD 1040
42WS953 S. Gate	Beta 47318 10/7/91	Charcoal	F36 Floor FS142	1140+/-80	AD 695 to 1030	AD 895
42WS953 S. Gate	Beta 47319 10/7/91	Charcoal	F41 Fill FS 122	1170+/-70	AD 690 to 1010	AD 885
42WS953 S. Gate	Beta 47320 10/7/91	Charcoal	F72 Hearth FS 331	920+/-100	AD 960 to 1285	AD 1065, 1075, 1155
42WS953 S. Gate	Beta 47321 10/7/91	Charcoal	F59 Fill FS 169	960+/-60	AD 985 to 1220	AD 1035
42WS953 S. Gate	Beta 47322 10/7/91	Charcoal	F108 Fill FS319	850+/-60	AD 1035 to 1285	AD 1215
42WS953 S. Gate	Beta 47323 10/7/91	Charcoal	F109 Fill FS392	730+/-60	AD 1215 to 1325 AD 1340 to 1390	AD 1285

Site No. Project/Collector	Lab No. Date	Material	Context/ Control	Conventional C14 Age (BP)	Cal Results 2 sigma (95%)	Intercept w/ cal. curve
42WS953 S. Gate	Beta 47324 10/7/91	Charcoal	F47 Fill FS 180	820+/-60	AD 1045 to 1105 AD 1115 to 1290	AD 1235
42WS953 S. Gate	Beta 47325 10/7/91	Charcoal	F92 Fill FS247/48	1060+/-80	AD 800 to 1170	AD 995
42WS955 S. Gate	Beta 47315 10/7/91	Charcoal	F41 Floor FS41	1150+/-60	AD 770 to 1010	AD 890
42WS955 S. Gate	Beta 47316 10/7/91	Charcoal	F39 Fill FS 96	900+/-50	AD 1020 to 1250	AD 1170
42WS955 S. Gate	Beta 47317 10/7/91	Charcoal	F33 Fill FS 121	1030+/-70	AD 885 to 1175	AD 1010
42WS955 S. Gate	Beta 66325 10/19/93	Charcoal	F30 Fill FS 252	1150+/-70	AD 705 to 1020	AD 890
42WS955 S. Gate	Beta 66326 10/19/93	Charcoal	F59 Fill FS 255	1060+/-80	AD 800 to 1170	AD 995
42WS955 S. Gate	Beta 66327 10/19/93	Charcoal	F75 Fill FS258	890+/-80	AD 1000 to 1285	AD 1175
42WS956 S. Gate	Beta 66328 10/19/93	Charcoal	F25 Fill FS 86	1000+/-50	AD 975 to 1170	AD 1020
42WS956 S. Gate	Beta 66329 10/19/93	Charcoal	F27 Floor FS 88	860+/-50	AD 1035 to 1275	AD 1205
42WS957 S. Gate	Beta 77119 11/28/94	Charcoal	F20 Floor	1670+/-160	AD 25 to 670	AD 405
42WS957 S. Gate	Beta 77120 11/21/94	Charcoal	-	680+/-50	AD 1265 to 1400	AD 1295
42WS957 S. Gate	Beta 77121 11/21/94	Charcoal	-	970+/-60	AD 980 to 1215	AD 1035

Site No. Project/Collector	Lab No. Date	Material	Context/ Control	Conventional C14 Age (BP)	Cal Results 2 sigma (95%)	Intercept w/ cal. curve
42WS957 S. Gate	Beta 77122 11/21/94	Charcoal	-	350+/-60	AD 1435 to 1665	AD 1515, 1585, 1625
42WS964 S. Gate	Beta 55648 9/28/92	Charcoal	F87 Fill FS 500	1220+/-70	AD 665 to 985	AD 800
42WS964 S. Gate	Beta 55649 9/28/92	Charcoal	F77 Fill FS 562	790+/-50	AD 1175 to 1295	AD 1260
42WS964 S. Gate	Beta 55650 9/28/92	Charcoal	F176 Fill FS727	1260+/-60	AD 660 to 895	AD 775
42WS964 S. Gate	Beta 55651 9/28/92	Charcoal	F179 Fill, F61 Floor, FS 686	1040+/-50	AD 895 to 1045 AD 1105 to 1115	AD 1005
42WS964 S. Gate	Beta 55652 9/28/92	Charcoal	F36 FS 31	1030+/-70	AD 885 to 1175	AD 1010
42WS964 S. Gate	Beta 55653 9/28/92	Charcoal	F119 Fill FS 582	1090+/-70	AD 790 to 1040	AD 980
42WS964 S. Gate	Beta 55654 9/28/92	Charcoal	F105 Floor FS 526	1120+/-80	AD 720 to 735 AD 760 to 1035	AD 960
42WS964 S. Gate	Beta 55655 9/28/92	Charcoal	F107 FS 493	1130+/-70	AD 770 to 1025	AD 905, 920, 950
42WS964 S. Gate	Beta 55656 9/28/92	Charcoal	F43 Floor FS 401	1220+/-70	AD 665 to 985	AD 800
42WS964 S. Gate	Beta 55657 9/28/92	Charcoal	F42 Floor FS 227	590+/-60	AD 1290 to 1435	AD <1400
42WS964 S. Gate	Beta 55658 9/28/92	Charcoal	F99 Fill FS 694	1000+/-70	AD 895 to 1205	AD 1020
42WS964 S. Gate	Beta 55659 9/28/92	Charcoal	F73 Floor FS 517	910+/-80	AD 990 to 1275	AD 1165

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42WS964 S. Gate	Beta 59593 1/22/93	Charcoal	F193 Fill FS 718	1300+/-70	AD 635 to 885	AD 695
42WS964 S. Gate	Beta 59594 1/22/93	Charcoal	F79 Fill FS 888	820+/-80	AD 1030 to 1300	AD 1235
42WS964 S. Gate	Beta 59595 1/22/93	Charcoal	F194 & 217 FS 911	840+/-70	AD 1030 to 1290	AD 1220
42WS964 S. Gate	Beta 59596 1/22/93	Charcoal	F205 Fill FS 859	880+/-60	AD 1020 to 1275	AD 1180
42WS964 S. Gate	Beta 59597 1/22/93	Charcoal	F112 Hearth	830+/-90	AD 1020 to 1305	AD 1225
42WS964 S. Gate	Beta 59598 1/22/93	Charcoal	F117 Hearth	1060+/-80	AD 800 to 1170	AD 995
42WS964 S. Gate	Beta 59599 1/22/93	Charcoal	F155 Hearth	1100+/-90	AD 720 to 735 AD 760 to 1065 AD 1075 to 1155	AD 975
42WS964 S. Gate	Beta 59600 1/22/93	Charcoal	F215 Hearth	1200+/-50	AD 695 to 975	AD 865
42WS964 S. Gate	Beta 59601 1/22/93	Charcoal	F62 Hearth	1020+/-60	AD 895 to 1170	AD 1015
42WS964 S. Gate	Beta 59602 1/22/93	Charcoal	F170 Hearth	830+/-90	AD 1020 to 1305	AD 1225
42WS964 S. Gate	Beta 59603 1/22/93	Charcoal	F196 Bench	990+/-90	AD 885 to 1245	AD 1025
42WS964 S. Gate	Beta 59604 1/22/93	Maize (+250 yrs @10%)	F42 Fill FS 221	1130+/-60	AD 780 to 1020	AD 905, 920, 950
42WS964 S. Gate	Beta 59605 1/22/93	Charcoal	F209 Hearth	1230+/-100	AD 640 to 1010	AD 790

Site No. Project/Collector	Lab No. Date	Material	Context/ Control	Conventional C14 Age (BP)	Cal Results 2 sigma (95%)	Intercept w/ cal. curve
42WS964 S. Gate	Beta 66330 10/19/93	Charcoal	F186 Fill FS951 (PI roast)	1200+/-50	AD 695 to 975	AD 865
42WS1319 Little Creek Mt.	Beta 7730 10/27/83	Charcoal	F141 P.H. Floor	1070+/-50	AD 885 to 1035	AD 990
42WS1340 S. Gate	Beta 66331 10/19/93	Charcoal	F33 Hearth FS 102	780+/-60	AD 1170 to 1300	AD 1265
42WS1340 S. Gate	Beta 66332 10/19/93	Charcoal	F31 Floor FS 98	850+/-80	AD 1020 to 1295	AD 1215
42WS1340 S. Gate	Beta 66333 10/19/93	Charcoal	F36 Hearth FS 101	880+/-60	AD 1020 to 1275	AD 1180
42WS1346 (Dalley and McFadden 1988)	Beta 6287 2/28/83	Charcoal	FS 204	760+/-90	AD 1045 to 1105 AD 1115 to 1400	AD 1275
42WS1346 (Dalley and McFadden 1988)	Beta 7726 10/27/83	Charcoal	FS 392	1330+/-50	AD 640 to 790	AD 680
42WS1346 (Dalley and McFadden 1988)	Beta 7727 10/27/83	Charcoal	FS 370	950+/-60	AD 990 to 1225	AD 1040
42WS1346 (Dalley and McFadden 1988)	Beta 23050 10/17/87	Charcoal	F96 Fill	1260+/-50	AD 665 to 885	AD 775
42WS1348 (Dalley and McFadden 1988)	Beta 7729 10/27/83	Charcoal	FS 51 Post	890+/-60	AD 1020 to 1270	AD 1175
42WS1348 (Dalley and McFadden 1988)	Beta 7728 10/27/83	charcoal	FS 44	1230+/-60	AD 670 to 970	AD 790
42WS1349 (Dalley and McFadden 1988)	Beta 6286 2/28/83	Charcoal	No -FS	1190+/-50	AD 705 to 980	AD 875

Site No. Project/Collector	Lab No. Date	Material	Context/ Control	Conventional C14 Age (BP)	Cal Results 2 sigma (95%)	Intercept w/ cal. curve
42WS1349 (Dalley and McFadden 1988)	Beta 23051 10/17/87	Charcoal	F51	1980+/-150	BC 375 to AD395	BC 45
42WS1349 (Dalley and McFadden 1988)	Beta 23052 10/17/87	Charcoal	F63	2000+/-110	BC 350 to 300 BC 215 to AD245	AD 15
42WS1365	Beta 10845 11/13/84	Charcoal	FS 14 F8 Fill	1210+/-50	AD 690 to 970	AD 855
42WS1630 (Westfall et al. 1987)	Beta 14341 11/85	Carbon	F 1	Modern	-	-
42WS1631 (Westfall et al. 1987)	Beta 14342 11/85	Carbon	Char. Lens	Modern	-	-
42WS1634 (Westfall et al. 1987)	Beta 14345 11/85	Carbon	Stratum ?	150+/-50	AD 1655 to 1950	AD 1685, 1740, 1810, 1930
42WS1712 (Walling and Thompson 1988)	Beta 14578 1986	Carbon	Pithouse Floor	1270+/-70	AD 650 to 905 AD 920 to 950	AD 770
42WS1712 (Walling and Thompson 1988)	Beta 14579 1986	Carbon	Pithouse fill Level 2	1250+/-50	AD 670 to 890	AD 780
42WS1712 (Walling and Thompson 1988)	Beta 14580 1986	Carbon	Cist 1, Fill Level 1	1630+/-80	AD 245 to 615	AD 425
42WS1828 (Westfall et al. 1987)	Beta 14343 11/85	Carbon	F 6	Modern	-	-
42WS1828 (Westfall et al. 1987)	Beta 14344 11/85	Carbon	F 7	Modern	-	-
42WS1828 (Westfall et al. 1987)	Beta 14346 11/85	Carbon	F 1	Modern	-	-

Site No. Project/Collector	Lab No. Date	Material	Context/ Control	Conventional C14 Age (BP)	Cal Results 2 sigma (95%)	Intercept w/ cal. curve
42WS1828 (Westfall et al. 1987)	Beta 14347 11/85	Carbon	F 3	140+/-60	AD 1655 to 1950	AD 1690, 1735, 1815, 1925
42WS1828 (Westfall et al. 1987)	Beta 14348 11/85	Carbon	F 2	Modern	-	-
42WS1828 (Westfall et al. 1987)	Beta 14349 11/85	Carbon	F 4	80+/-60	AD 1670 to 1780 AD 1795 to 1945	-
42WS1831 Green Valley	Beta 22830 10/6/87	Charcoal	CS 391	1170+/-80	AD 680 to 1020	AD 885
42WS1831 Green Valley	Beta 22831 10/6/87	Charcoal	CS 392	1130+/-80	AD 705 to 1035	AD 905, 920, 950
42WS1831 Green Valley	Beta 22832 10/6/87	Charcoal	CS 393	1690+/-210	BC 115 to AD770	AD 390
42WS2103	RL 2085 12/6/88	Charcoal	Agave roast	1740+/-120	AD 45 to 590	AD 330
42WS2113	Beta 33238 10/11/89	charcoal	F16 Hearth	140+/-60	AD 1655 to 1950	AD 1690, 1735, 1815, 1925
42WS2113	Beta 33239 10/11/89	charcoal	F3 Hearth	90+/-50	AD 1675 to 1775 AD 1800 to 1945	-
42WS2113	Beta 33240 10/11/89	charcoal	F4 Hearth	50+/-50	AD 1685 to 1740 AD 1810 to 1930	-
42WS2113	Beta 33241 10/11/89	charcoal	F17 Hearth	480+/-60	AD 1395 to 1505 AD 1595 to 1620	AD 1435
42WS2113	Beta 33242 10/11/89	charcoal	F10 Fill Up Struc.	750+/-70	AD 1175 to 1325 AD 1340 to 1390	AD 1275

Site No. Project/Collector	Lab No. Date	Material	Context/ Control	Conventional C14 Age (BP)	Cal Results 2 sigma (95%)	Intercept w/ cal. curve
42WS2113	Beta 33243 10/11/89	charcoal	F24 Fill Hearth	190+/-60	AD 1640 to 1950	AD 1675, 1775, 1800, 1945
42WS2114 Shady Shelter (McFadden 2005)	Beta-208483 9/29/05	Plant material <i>Achnatherum speciosum</i>	F5 cist	170+/-40	AD 1650 to 1890 AD 1910 to 1959	AD 1680, 1770, 1800, 1940, 1950
42WS2195 (Nielson 1998)	Beta 28330 11/24/88	Charcoal	FS 182 Stained Sand	1480+/-70	AD 430 to 675	AD 605
42WS2195 (Nielson 1998)	Beta 28331 11/24/88	Charcoal	Hearth F64	820+/-70	AD 1035 to 1295	AD 1235
42WS2195 (Nielson 1998)	Beta 28332 11/24/88	Charcoal	FS 227 Stained Sand	950+/-60	AD 990 to 1225	AD 1040
42WS2195 (Nielson 1998)	Beta 28333 11/24/88	Charcoal	FS 228	1520+/-60	AD 420 to 650	AD 560
42WS2195 (Nielson 1998)	Beta 28334 11/24/88	Charcoal	FS 231	1610+/-110	AD 220 to 655	AD 435
42WS2195 (Nielson 1998)	Beta 28335 11/24/88	Charcoal	FS 232	1190+/-70	AD 680 to 1000	AD 875
42WS2195 (Nielson 1998)	Beta 28336 11/24/88	Charcoal	FS 321	1930+/-80	BC 75 to AD250	AD 85
42WSs160 (Pahoon Cave, BLM)	Beta- 258552	Basket (AMS) (-22.6)	Surface, cave	930+/-40	AD 1020-1210	AD 1050, 1090, 1130, 1140
42WSs160 (Pahoon Cave, BLM)	Beta-258553	Rabbit stick (-24.0)	Surface, cave	1050+/-50	AD 890-1040	AD 1000
42WSs160 (Pahoon Cave, BLM)	Beta-258554	Stick (small, green) (-24.4)	Surface, cave	1060+/-50	AD 890 - 1040	AD 990

Site No. Project/Collector	Lab No. Date	Material	Context/ Control	Conventional C14 Age (BP)	Cal Results 2 sigma (95%)	Intercept w/ cal. curve
42Ws5160 (Pahoon Cave, BLM)	Beta-258555	Basket (AMS)	Surface, cave	820+/-40	AD 1160-1270	AD 1220
42WS-----	Beta 40334 11/13/90	Charcoal (Rd. Cut)	CS90-4 MW/MC-4	40+/-60	AD 1680 to 1745 AD 1805 to 1935	-
42IN37	Beta 77123 11/21/94	Charcoal	-	900+/-50	AD 1020 to 1250	AD 1170
42IN2262	Beta - 222448	Bone collagen (-10.5)	AS68	990+/-40	AD 990 to 1160	AD 1020

APPENDIX B

Cedar City District, GSENM
Bureau of Land Management
Tree-Ring Dates and Submissions
 Compiled and edited by D.A. McFadden

Site No	TR Date	Species	TR Lab #	Accession No.	Report/Remarks/Collector	Geographical Area
42Ka4450	Not Dated	PNN	UAM-65	A-1397	Kanab Files 12/7/98	Kaiparowits Plateau
42Ka4450	Not Dated	PNN	UAM-66	A-1397	Kanab Files 12/7/98	Kaiparowits Plateau
42Ka4450	Not Dated	PNN	UAM-67	A-1397	Kanab Files 12/7/98	Kaiparowits Plateau
42Ka4450	Not Dated	PNN	UAM-68	A-1397	Kanab Files 12/7/98	Kaiparowits Plateau
42Ka4450	Not Dated	PNN	UAM-69	A-1397	Kanab Files 12/7/98	Kaiparowits Plateau
42Ka1168	0075p-0217rb	PNN	KCU-4		W.J.R. letter 6/25/92 (Stallings 1941 specimen)	Grand Staircase
42Ka1168	0149-0220rb	JUN	KCU-9		W.J.R. letter 6/25/92	Grand Staircase
42Ka1494	Not Dated			A-843	Kanab Files Judd's Cave #8	Grand Staircase
42Ka1504	Not Dated	OAK		A-843	Kanab Files 11 oak samples	Grand Staircase
42Ka1504	Not Dated	JUN	UTM-09	A-813	Kanab Files Cottonwood Canyon	Grand Staircase
42Ka1504	Not Dated	JUN	UTM-10	A-813	Kanab Files Cottonwood Canyon	Grand Staircase
42Ka1504	944p-1111vv	JUN	UTM-11	A-813	Kanab Files Cottonwood Canyon	Grand Staircase
42Ka1504	Not Dated	JUN	UTM-12	A-813	Kanab Files Cottonwood Canyon	Grand Staircase
42Ka1504	1052p-1099r	JUN	UTM-13	A-813	Kanab Files Cottonwood Canyon	Grand Staircase
42Ka1504	1013p-1101r	JUN	UTM-14	A-813	Kanab Files Cottonwood Canyon	Grand Staircase
42Ka1504	921±p-1054vv	JUN	UTM-15	A-813	Kanab Files Cottonwood Canyon	Grand Staircase
42Ka1504	Not Dated	JUN	UTM-16	A-813	Kanab Files Cottonwood Canyon	Grand Staircase
42Ka1504	Not Dated	JUN	UTM-17	A-813	Kanab Files Cottonwood Canyon	Grand Staircase
42Ka1504	922±p-1101rb	JUN	UTM-18	A-813	Kanab Files Cottonwood Canyon	Grand Staircase
42Ka1504	982p-1099+rb	JUN	UTM-19	A-813	Kanab Files Cottonwood Canyon	Grand Staircase
42Ka1504	963p-1099+rb	JUN	UTM-20	A-813	Kanab Files Cottonwood Canyon	Grand Staircase
42Ka1520	1046±p-1147vv	JUN	UTM-099	A-1539	Kanab Files 12/24/01	Grand Staircase
42Ka1520	1030±p-1148+B	JUN	UTM-100	A-1539	Kanab Files 12/24/01	Grand Staircase
42Ka1520	1047p-1150+v	JUN	UTM-101	A-1539	Kanab Files 12/24/01	Grand Staircase
42Ka1520	1057p-1149+v	JUN	UTM-102	A-1539	Kanab Files 12/24/01	Grand Staircase
42Ka1520	1050p-1150+rb	JUN	UTM-103	A-1539	Kanab Files 12/24/01	Grand Staircase
42Ka1520	1044p-1149+vv	JUN	UTM-104	A-1539	Kanab Files 12/24/01	Grand Staircase
42Ka1520	1075p-1118vv	JUN	UTM-105	A-1539	Kanab Files 12/24/01	Grand Staircase
42Ka1520	1052p-1149+v	JUN	UTM-106	A-1539	Kanab Files 12/24/01	Grand Staircase
42Ka1520	1051p-1138vv	JUN	UTM-107	A-1539	Kanab Files 12/24/01	Grand Staircase
42Ka1568	N.A.	-	-	-	Submitted by D. Larson (Morley 1993:160)	Grand Staircase
42Ka1576	Not Dated		UTM-36	A-843	Kanab Files; 17 submitted, var.	Grand Staircase
42Ka1576	(-0293p)-(-0002++rGB)	PNN	UTM-39		(3 BC) W.J.R. 6/25/92	Grand Staircase
42Ka1576	(-0245p)-(-0080++vv)	JUN	UTM-40		(81BC) W.J.R. 6/25/92	Grand Staircase
42Ka1576	(-0265p)-(-0005++GB)	PNN	UTM-51		(5 AD) W.J.R. 6/25/92	Grand Staircase

Site No	TR Date	Species	TR Lab #	Accession No.	Report/Remarks/Collector	Geographical Area
42Ka1576	Not Dated		UTM-36		W.J.R. 11/25/92	Grand Staircase
42Ka1694	Not Dated			A-669	2 samples 1/10/85 (Initially cited 42Ka1520)	Grand Staircase
42Ka1695	Not Dated	JUN	UTM-125	A-1613	Kanab Files 3/17/04	Grand Staircase
42Ka1695	Not Dated	JUN	UTM-126	A-1613	Kanab Files 3/17/04	Grand Staircase
42Ka1695	Not Dated	S/F	UTM-127	A-1613	Kanab Files 3/17/04	Grand Staircase
42Ka1695	Not Dated	NONCON	UTM-128	A-1613	Kanab Files 3/17/04	Grand Staircase
42Ka1695	Not Dated	QUER	UTM-129	A-1613	Kanab Files 3/17/04	Grand Staircase
42Ka1695	Not Dated	JUN	UTM-130	A-1613	Kanab Files 3/17/04	Grand Staircase
42Ka1696	785+-1111++vv	JUN	UTM-33	A-843	Kanab Files 2/15/89	Grand Staircase
42Ka1796	Not Dated				2 samples 1977	Grand Staircase
42Ka1802	Not Datable	JUN	UUM-221		"Complacent; very compressed."	Grand Staircase
42Ka1802	Not Datable	JUN	UUM-222			Grand Staircase
42Ka1802	Not Datable	JUN	UUM-223			Grand Staircase
42Ka1819	Not Dated			A-843	Kanab Files Trail Canyon	Grand Staircase
42Ka1819	Not Dated	JUN	UTM-109	A-1576	kiva post and assoc. timber Letter July 10, 2002 (also see earlier submission above)	Grand Staircase
42Ka1819	Not Dated	JUN	UTM-110	A-1576	kiva post and assoc. timber Letter July 10, 2002 (also see earlier submission above)	Grand Staircase
42Ka3322	Not Dated		SWI-197	A-843	Kanab Files	Grand Staircase
42Ka3575	Not Dated	JUN			Dairy Canyon burial W.J.R. 1/15/92 8 samples "good x-dating"	Grand Staircase
42Ka3833	Not Dated	Oak			W. Robinson 11/92; FS1 (1 m. timber, burned both ends	Grand Staircase
42Ka3834	Not dated	JUN			W. Robinson 11/92 ; (3 timbers)	Grand Staircase
42KA4280	Not Dated	JUN	UTM-87a,b	A-1437	6/2/99	Grand Staircase
42KA4280	Not Dated	JUN	UTM-88	A-1437	6/2/99	Grand Staircase
42KA4280	0640-0725vv	PNN	UTM-89	A-1437	6/2/99	Grand Staircase
42KA4280	Not Dated	JUN	UTM-90a,b	A-1437	6/2/99	Grand Staircase
42KA4280	Not Dated	JUN	UTM-91a,b	A-1437	6/2/99	Grand Staircase
42KA4280	Not Dated	JUN	UTM-92a,b	A-1437	6/2/99	Grand Staircase
42KA4280	Not Dated	JUN	UTM-93	A-1437	6/2/99	Grand Staircase
42KA4280	Not Dated	JUN	UTM-94	A-1437	6/2/99	Grand Staircase
42KA4280	Not Dated	JUN	UTM-95a,b	A-1437	6/2/99	Grand Staircase
42KA4280	0519-0725++vv	PNN	UTM-96a-e	A-1437	6/2/99 A poor ring count past 700	Grand Staircase
42KA4280	Not Datable	JUN	UTM-97	A-1437	6/2/99	Grand Staircase
42Ka5061	Not Datable	JUN			Kanab Files 12/24/01	Grand Staircase
42Ka6043	Not dated	JUN	UTM-131	A-1758	Submitted 2/2005/reported 4/9/05/ "erratic, compressed"	Grand Staircase
42Ka6043	Not dated	JUN	UTM-132	A-1758	4/9/05	Grand Staircase
42Ka6043	Not dated	JUN	UTM-133	A-1758	4/9/05	Grand Staircase
42Ka6043	Not dated	JUN	UTM-144	A-1758	4/9/05	Grand Staircase
42Ka5571	0993p-1150+r	PNN	UTM-108	A-1539	Kanab Files 12/24/01	Grand Staircase
42Ka6293	1023+vv	unk	NA	NA	MOAC, Nash 2013; E PII pithouse	Grand Staircase
42Ka6293	1009+vv	unk	NA	NA	MOAC, Nash 2013; E PII pithouse	Grand Staircase
42Ws1331	Not Dated			A-669	3 samples 1/10/85	Grand Staircase
42Ws200	480p-691vv		UUM-101		Aikens 1965, Parunuweap Knoll	Grand Staircase

Appendix B

Site No	TR Date	Species	TR Lab #	Accession No.	Report/Remarks/Collector	Geographical Area
42Ws920	Not Dated			A-669	8 samples 1/10/85	Grand Staircase
AR-03-07-03-909	Not Dated			A-843	Kanab Files N. Kaibab FS	Grand Staircase
AZ B:1:102	Not Dated	JUN	ABM-30	A-1198	Corn Grower Site, Kanab Files	Grand Staircase
AZ B:1:102	1016-1096vv	JUN	ABM-31	A-1198	Corn Grower Site, Kanab Files	Grand Staircase
AZ B:1:102	Not Dated	JUN	ABM-32	A-1198	Corn Grower Site, Kanab Files	Grand Staircase
AZ B:1:102	0968-1148++v	JUN	ABM-33	A-1198	Corn Grower Site, Kanab Files	Grand Staircase
AZ B:1:102	Not Dated	JUN	ABM-34	A-1198	Corn Grower Site, Kanab Files	Grand Staircase
AZ B:1:102	Not Dated	JUN	ABM-35	A-1198	Corn Grower Site, Kanab Files	Grand Staircase
Evans Site	0944+p-1104r	PNN	UTM-4	A-257	Kanab Files letter 23Feb.87 Evans	Great Basin
42Ga2672	Not Dated	JUN	UUM-224	A-1556	Room 14 post, erratic ring series	Kaiparowits Plateau
42GA34	1041p-1165+vv		COO-13-2		Bannister et al 1969 Coombs site , Pithouse F88	Circle Cliffs/T.A.
42GA34	1068p-1160+B		COO-15-1		Bannister et al 1969 Coombs site, L shaped roomblock	Circle Cliffs/T.A.
42GA34	1061p-1163+vv		COO-15-2		Bannister et al 1969 Coombs site, L shaped roomblock	Circle Cliffs/T.A.
42GA34	1056-1135v		COO-17-1		Bannister et al 1969, Coombs site, "Pithouse"	Circle Cliffs/T.A.
42GA34	1049-1169+vv		COO-18-1		Bannister et al 1969; Coombs site, Pithouse F117	Circle Cliffs/T.A.
42Ga34	954p-1095+vv	JUN	COO-21	A-1044	Kanab Files 11/24/92 Coombs site, Qd 2 ,Level 1, pithouse	Circle Cliffs/T.A.
42Ga34	1003±p-1165+vv	JUN	COO-24	A-1044	Kanab Files 11/24/92 Coombs site, Structure A, Room 4	Circle Cliffs/T.A.
42GA34	1054p-1159+vv		COO-7		Bannister et al 1969; Coombs site , U shaped roomblock	Circle Cliffs/T.A.
42GA34	1018p-1142vv		COO-8-1		Bannister et al 1969; Coombs site, "pithouse "	Circle Cliffs/T.A.
42GA34	941p-1129v		COO-8-2		Bannister et al 1969; Coombs site, "pithouse"	Circle Cliffs/T.A.
42GA34	1047p-1164+vv		COO-8-3		Bannister et al 1969; Coombs site, "pithouse"	Circle Cliffs/T.A.
42Ga3728	0953p-1156G	JUN	UUM-211	A-1198	Kanab Files 6/14/95	Kaiparowits Plateau
42Ga3728	Not Dated	JUN	UUM-212	A-1198	Kanab Files 6/14/95	Kaiparowits Plateau
42Ga3728	0865±p-1149++vv	JUN	UUM-213	A-1198	Kanab Files 6/14/95	Kaiparowits Plateau
42Ga3728	1031p-1157+v	JUN	UUM-214	A-1198	Kanab Files 6/14/95	Kaiparowits Plateau
42Ga4167	Not Dated	JUN	N/A	A-1637	Hummingbird Hill 8/15/03 Janetski et al. 2012	Kaiparowits Plateau
42Ga43	899p-1007vv	DF	COO-25	A-1637	(Rattle Snake Pt.) 8/15/03 Janetski et al. 2012	Kaiparowits Plateau
42Ga43	Not Dated	JUN	COO-26	A-1637	(Rattle Snake Pt.) 8/15/03 Janetski et al. 2012	Kaiparowits Plateau
42Ga43	Not Dated	JUN	COO-27	A-1637	(Rattle Snake Pt.) 8/15/03 Janetski et al.2012	Kaiparowits Plateau
42Ga43	-1000vv		COO-31		(Rattle Snake Pt.)	
42Ga4983	0910-1083++vv	JUN	UUM-225	A-1556	Kanab Files 12/25/01	Kaiparowits Plateau
42Ka1456	0792p-980vv	PNN	UUM-198	A-843	Kanab Files 2/15/89	Kaiparowits Plateau
42Ka1625	0991±p-1120+vv	JUN	UTM-75	A-1351	Kanab Files 5/21/98	Kaiparowits Plateau
42Ka1625	0955±p-1130+vv	JUN	UTM-77	A-1351	Kanab Files 5/21/98	Kaiparowits Plateau
42Ka2683	0960p-1143++g	JUN	UAM-29	A-669	Kanab Files 2/23/87	Kaiparowits Plateau
42Ka2683	0842p-1152++vv	JUN	UAM-59	A-1367	Kanab Files 5/21/98	Kaiparowits Plateau
42Ka2683	1078p-1174vv	PNN	UAM-61	A-1367	Kanab Files 5/21/98	Kaiparowits Plateau
42Ka2683	1010±p-1164vv	JUN	UAM-62	A-1367	Kanab Files 5/21/98	Kaiparowits Plateau
42Ka2683	0979-1056vv	JUN	UAM-63	A-1367	Kanab Files 5/21/98	Kaiparowits Plateau
42Ka3383	Not Dated				Kanab Files 8/88 (submitted)	Kaiparowits Plateau
42Ka4875	Not Dated	JUN	UUM-220	A-1460	Kanab Files 12/31/99 (erratic growth, burned beam end)	Kaiparowits Plateau

Site No	TR Date	Species	TR Lab #	Accession No.	Report/Remarks/Collector	Geographical Area
42Ka4883	Not Dated	JUN	UTM-98	A-1460	Kanab Files 12/31/99	Kaiparowits Plateau
42Ka547	1050p-1189v	UNK	UUM-85	UNK	Fowler & Aikens 1963; Robinson and Cameron 1991	Kaiparowits Plateau
42Ws1346	422p-694+vv	DF	UAM-14	A-707	Kanab Files Little Man	St. George Basin
42Ws1346	379fp-606+vv	JUN	UAM-50	A-707	Kanab Files Little Man, pithouse.	St. George Basin
42Ws1348	Not Dated			A-707	Kanab Files letter	St. George Basin
42Ws388	426fp-713vv	PNN	UAM-16	A-707	Kanab Files Quail Creek pithouse	St. George Basin
42Ws953	Not Datable	JUN			Southgate FS-225 Let. 1/15/92	St. George Basin

APPENDIX C

MACROFLORAL AND POLLEN TABLE

Major economic species identified
on the Grand Staircase by period

Site #	Period	Pollen	Macroflora
42Ka4859 Road Kill	Late BMIII/PI	<i>Zea mays</i> Cheno-am Liliaceae Poaceae <i>Cleome</i> <i>Cylindropuntia</i> <i>Opuntia</i> <i>Rhus</i> <i>Typha</i>	<i>Zea mays</i> <i>Cheno -am</i> <i>Brassicaceae</i> <i>Oryzopsis</i> <i>Sphaeralcea</i> <i>Phaseolus</i> Cotyledon (2)
42Ka4280 Park Wash F5 Pithouse floor contact	Late BMIII/PI	Artemesia Cheno-Ams Low-spine High Spine Cylindropuntia <i>Zea mays</i> Sheperdia Poaceae Typha augustifolia "type"	<i>Zea mays</i> (150) Brassicaceae (2) Chen-am (2) <i>Oryzopsis</i> (2)
42Ka4280 F2 Trash fill of F5	BMIII/PI	No sample	<i>Zea mays</i> (81) Cheno-am (1) <i>Amaranthus</i> (1) <i>Portulaca</i> (1)
42Ka4280 F1 pithouse floor contact	Pueblo 1	Artemsia High spine Poaceae	<i>Zea mays</i> (34) <i>Helianthus</i> (1) <i>Oryzopsis</i> (1)
42Ka2594 EFN	1130+/-120 BP (AD820?) Pueblo I?	<i>Zea mays</i> (7%) (12%) Cheno-ams Composites <i>Helianthus</i> "type" Graminae <i>Cylindropuntia</i>	<i>Chenopodium</i> (20) <i>Curcurbita</i> sp (7) <i>Portulaca</i> (3) <i>Opuntia</i> (1)
42Ka2584	960+/-50 bp	Cheno-ams	<i>Juniperus</i> (berrys)

EFN	840+/-50 AD990? EP II? AD1110 LP II? 1050 average?	Helianthus(3%) Zea (1) Artemisia High - spine Compositae Cleome(1) Cylindropuntia <i>Typha</i> (modern?)	<i>Chenopodium</i> <i>Zea</i>
42Ka2664 burial	PII/III	No sample	<i>Chenopodium</i> seed (abundant) (
42Ka 2667 Dead Raven	Early PII	No sample	<i>Zea mays</i> <i>Phaseolus vulgaris</i> <i>Chenopodium</i> sp (unburned) <i>Sphaeralia</i> sp Ground cherry
42Ka1504 Various locations	PI -L.PII	No sample	<i>Zea mays</i> <i>Pinus edulis</i> <i>Juniperus osteosperma</i> <i>Quercus</i> sp. <i>Cucurbita</i> sp. <i>Phaseolus vulgaris</i> Cactaceae
42Ka 1568	PIII For CF	No sample	<i>Zea mays</i> .(97) <i>Cheno-ams</i> .(92) <i>Portulaca</i> sp.(84) <i>Pinus</i> sp.(84) <i>Juniperus</i> sp(.20) <i>Phaseolus vulgaris</i> (.20) Malvaceae (.12) Asteraceae (sunflower) (.04) <i>Ambrosia</i> sp(.04) <i>Plantago</i> sp(.04) <i>Oryzopsis hymenoides</i> (.04) Polygonaceae (Buckwheat)(.04) <i>Rubus</i> sp (.04)
Room 1 (Storage)		No sample	<i>Zea mays</i> <i>Phaseolus vulgaris</i> <i>Cheno-ams</i> <i>Oryzopsis hymenoides</i> <i>Portulaca</i> sp
Room12			<i>Zea mays</i>

42Ka3976 Arroyo site	PII -PIII For CF	<i>Zea mays</i> <i>Cucurbita</i> <i>Cylindropuntia</i> <i>Typha</i> <i>Cylindropuntia</i> <i>Shepherdia</i> <i>Gossypium (1pollen)</i> Apiaceae Poaceae	<i>Zea mays</i> (78%) Cheno-ams <i>Phaseolus</i> <i>Stipa hymenoides</i> Portulacaceae Nut shell (1)
42Ka3976 Archaic level		Artemisia Cheno-ams Poaceae Ground cherry	No sample
42Ka 1969 Kanab Site	Early PII	<i>Zea mays</i> Cheno-ams <i>Cleome</i> <i>Ephedra</i> <i>Eriogonum</i> <i>Opuntia</i> <i>Typha</i>	No sample
42Ka1978 Gnatmare	PIII		
42Ka 2574 Hog Canyon			
42Ka6293	Early PII	Cheno-ams <i>Opuntia</i> Poaceae Cholla Poss. cattail	<i>Zea mays</i> <i>Gossypium (charred)</i> <i>Atriplex canescens</i> <i>Opuntia</i> <i>Pinus edulis (1 seed)</i> Poaceae (plus turkey and eggs)

APPENDIX D

TEMPORAL AND GEOGRAPHICAL DISTRIBUTION OF RED WARES IN THE EASTERN VIRGIN REGION

The impetus for and origins of this review are largely a result of the Shinarump Project, an effort spearheaded by Margaret Lyneis in the late 1990's to address problems of typological classification with the Shinarump series in general and Shinarump red ware in particular. Lyneis summarized the results of her thin-section and refiring analyzes of sherds submitted from the eastern Virgin region including Seaman Wash, Kitchen Corral (the Arroyo site), House Rock Valley, and the eastern Paria Plateau (Lyneis 1996,1997). Her main concerns were: 1) to provide a consistent description of the various types; to suggest that Middleton red ware types were, in all but name, simply red, oxidized, versions of Shinarump pottery and 2) define their distribution in time and space. The issue of where and when the types were produced was not resolved other than it was thought to be somewhere " east of Kanab".

Since that effort, the 2007 Museum of Northern Arizona ceramic conference formalized the definition of local (Middleton) red ware types as Shinarump Red Ware (Allison 2007). Jim Collette (2009) contributed an account of the complex history of the Shinarump series and discussed the typological difficulties of Colton's placement of the type in the Little Colorado series of San Juan Red Ware. Further clarification of the type, its variability and associations, is expected from Collette's analysis of the Grand Canyon (GRCA) ceramic analysis (personal communication 2014). What remains then is to place the several red ware types in time and space in the eastern Virgin region.

The goal of this section is twofold: 1) To develop a red ware chronology by establishing the beginning and end dates for the introduction of exotic San Juan Red Ware (SJRW), Tsegi Orange Ware (TOW) and the earliest dates for the production of local Shinarump Red Ware (SRW) types. Most of dated contexts for red ware are reported in this volume. 2) Refine our understanding of where in the eastern Virgin region SRW was likely produced. As Lyneis cautioned it "may have been produced in a more limited area than the plain wares" (Lyneis 1996). This was a cogent point and for this reason a geographically extensive review of previous survey and excavation was undertaken.

As part of the geographical review, a sample of curated sherds from Late Pueblo II sites located east of Johnson Canyon were examined. In addition, survey and excavation sherd tallies from the Kaiparowits Plateau, Fiftymile Mountain, Paria Plateau, and House Rock Valley area were reviewed to identify trends in frequency over time and space. While the three red wares were found to be essentially sequential on the Grand Staircase, the frequency relationship between TOW and SRW over the eastern Virgin area is more complicated. Variability in the sherds examined from the Grand Staircase may indicate multiple production areas - both the Grand Staircase as well as the Paria Plateau have high frequencies of Shinarump Red Ware and the resources necessary to produce it.

Temporal Distribution

The following section reviews radiocarbon, tree-ring, and luminescence dates from sites on, or near, the Grand Staircase physiographic section with ceramic assemblages that include San Juan Red Ware, Tsegi Orange Ware, or Shinarump Red Ware and describes how frequencies of the three vary over time. Although the number of sites with sherds in well-dated contexts is limited, the beginning and terminal dates for these wares are reasonably well bracketed and correspond closely with the established temporal framework for the Grand Staircase physiographic section (Table 1).

PERIOD	DATES	CERAMIC Assemblage	ARCHITECTURE (horizon)	ARTIFACT (horizon)	SITES (typical)
Pueblo III	AD 1150-1250+	Shinarump & Virgin Series (corrugated) SRW	Plaza pueblos Deep earthen pithouses Slab paved storage	Same as below	Pottery Knoll Gnatmare Arroyo
Late Pueblo II	AD 1050/1100-1150	Shinarump & Virgin Series (corrugated) (TOW) (SRW begins late)	Linear and "L" shaped (courtyard) roomblocks Deep masonry-lined pithouses	Spindle whorls Bull Creek PP's Parowan PP's	42Ka1504 Judd's Cave 6 42Ka1819, Trail Canyon 42Ka1812 (Judd's Cave 3)
Early Pueblo II	AD 900-1050/1100	Shinarump and Virgin Series SJR (T)	Jacal room blocks Shallow benched pithouses	Parowan PP's	42Ka6293 Kanab site Dead Raven
Pueblo I	AD 700-900	Shinarump & Virgin series SJR (T)	Shallow benched pithouses Cist alignments	Abajo/Rose Spring	Road Kill Park Wash
BM III (Late)	AD 600-700	Shinarump Gray Mesquite Gray & B/g, "local" plain	Shallow benched pithouses; slab cists	Abajo PPs	Park Wash Road Kill
BM III (early)	AD 500-600	Mesquite/Obilisk gray, "local" plain	Shallow benched pithouses; slab cists	Rose Spring PPs	42Ka1796 42Ka2780
BM II	BC100/0-AD 500	None	Variable pithouses Cist & bed rock storage pits	"Gypsum" White Dog Corner-notch	Cave du Pont South Fork, 42Ka1576 Reservoir site

Table 1. Grand Staircase chronology.

San Juan Red Ware

The production of San Juan Red Ware (SJR) has been characterized as specialized and limited to the northern San Juan region during the eighth through tenth centuries A.D. (Hegmon et al. 1997). Its occurrence on the Grand Staircase is rare but has been found in trace amounts on several excavated sites (Table 1). The earliest is a single sherd, apparently Abajo or Bluff Black-on-red, from the late Basketmaker III/early Pueblo I Road Kill site located along Park Wash. A few miles to the east in Johnson

Canyon Thompson reported 15 plain red sherds from the slightly later Dead Raven site (Walling and Thompson 2004). At nearby Bonanza Dune Aikens (1965) excavated a sequence of super-positioned pithouses and a masonry-lined “kiva” that yielded abundant “unidentified” SJR (73) as well as TOW (18) and “Middleton” red ware (68). Ten miles west, on the PI/EPII Kanab site, David Breternitz identified five sherds of Bluff Black-on-red (Kvamme and Nickens 1981).

Deadmans style has not been reported on the Grand Staircase but has to the south on the Kaibab Plateau where it is associated, in one case, with a single Kana-a sherd and another with St George Black-on-gray and a plain gray utility ware assemblage (McFadden 2006). It is worth noting that at the Early PII site 42Ka6293 located immediately north of Kanab, of nearly 8,000 sherds, Janet Halgopian reported no red ware. The pithouse yielded a date of A.D. 1022vv making this site is one of the latest Early PII sites yet excavated. Other than a single sherd assumed to postdate the occupation, no corrugated sherds occurred on the site. The author suggests it was abandoned prior to A.D. 1050. (Nash 2013).

The Early Pueblo II ceramic assemblage in general, and on 42Ka6293 in particular, consists of North Creek Gray (plain), the Black Mesa-like type St. George Black-on-gray and late in the period, a broader lined Sosi-like type locally called North Creek Black-on-gray (Halgopian 2013). The assemblage underscores the relative isolation from eastern influences in the Virgin region during the early Puebloan period A.D. 500-1050.

Tsegi Orange Ware

By A.D.1100 the ceramic assemblage, as well as architecture and other material culture traits in the eastern Virgin region change dramatically. This is the beginning of the Late PII Period and the on-set of a complex social setting that has been called the “Kayenta Intrusion” (Lyneis 1996, McFadden 2002). Tsegi Orange Ware (TOW) appears for the first time in assemblages that include traces of Tusayan Series Dogoszhi Black-on-white, local versions of Sosi Black-on-white, and local corrugated types (see Figure 75 this volume). As Allison (2007) has pointed out, the earliest TOW type is a Deadmans-like design on Medicine Black-on-red. The Kanab Creek Archaeological Project (42Ka3831) encountered such a panel from a burial dated Cal A.D. 1020-1210 (Beta 243765) with intercepts of A.D. 1060, 1080 and 1150 (Figure 1). More typical Medicine Black-on-red designs have been found on vessels on the eastern Grand Staircase (Figure 2).

The best dated site for the on-set of the Late Pueblo II period at this time is Cottonwood Canyon Cliff Dwelling (42Ka1502) which was initially described by Neil Judd as Cave 6 (Judd 1926). The site consists of a number of small storage rooms and a Pueblo I pithouse constructed prior to a major building event, tree-ring dated to the period A.D.1099-1111vv (Table 1). Architectural innovations on this site are significant and include the masonry-lined pit structure, a large surface residential room, and several masonry storage roomblocks (Judd 1926, Tipps 1989). Medicine Black-on-red and Dogoszhi Black-on-red sherds (see Figure 75 this volume) were recovered from the fill of the pit structure which yielded a conventional radiocarbon date of 840+/- 80 BP (Beta24402) from charcoal in the hearth. A Citadel Polychrome sherd, recovered from the occupational surface sealed by wall-fall from the surface residential room is the latest type on the site (Figure 3). Citadel Polychromes beginning date is about A.D. 1100 on Paiute Mesa and the Rainbow Plateau (Ambler1985,Geib et al. 2001). Accepting this date, the travel time for Citadel pottery to arrive at 42Ka1504 seems remarkably short, nevertheless, it

appears to have become common on the Grand Staircase shortly after A.D. 1100, possibly a decade or two into the 12th century.

Corrugated sherds on 42Ka1504 account for 62% of the grayware collection, a conservative number given the earlier Pueblo I occupation (Tipps and Hewitt 1989). Considering only Shinarump plain and corrugated types, presumably all Late Pueblo II, 74% are corrugated. It is somewhat surprising that while Shinarump Corrugated and late white ware styles (Sosi and Dogoszhi) occur in association with Tsegi Orange Ware. Shinarump Red Ware is totally absent. Apparently local potters quickly accented Kayenta white ware styles and corrugation techniques but for some reason there was a lag in the production of a local red ware.

Date TR, C14	Sites (this volume)	San Juan Red Ware	Tsegi Orange Ware	Shinarump Red Ware	S/r/w Index	g/w index	% red
AD 700-900	Road Kill, 42Ka4859	100% (1)	-	-	0	0	T
AD 1000	Dead Raven, 42Ka2667	100% (15)	-	-	0	0	T
AD 1000	Kanab Site, 42Ka19969	100% (5)	-	-	0	0	T
AD 1022+	42Ka6293	-	-	-	0	0	0%
AD 1111vv	CCCD, Cave 6 42Ka1504	-	100% (19)	-	0	.62	<1%
AD 1020 - AD 1210	42Ka3831, F18 burial (6)	-	2 Medicine b/r	-	0		-
AD 1020-1260	42Ka1812, (Cave 3)	-	-	-	0		-
AD 970-1190	42Ka1819 (Trail Canyon Alcove)	-	-	-	0		-
AD 1148++v	Cornrower Kiva fill AZ B:1:102 (BLM)	-	0%	100% (n-13)	1.00	?	-
A.D. 1315	Reservoir Site (PH) AZ B:1:35(BLM)	-	9% (n-4)	91% (n-41)	.91	?	
A.D. ? to 1215+	Gnatmare 42Ka1978	-	9% (n-12)	91% (n-116)	.91	.86	18%
<A.D.1240	Arroyo 42Ka3976 (total)	-	24% (n-129)	76% (n-398)	.76	.86	4%
A.D. 1200+	Arroyo, 42Ka3976, PS-1 floor	-	-	100% (n-11)	1.00	?	
A.D. 1200+	Arroyo 42Ka3976, PS- 4, burial (fill)	-		1 vessel	1.00		
A.D. 1195- 1300 (maize)	Pottery Knoll 42Ka1568, Room 1	-	1?	10	.91	-	
A.D.1175- 1295	Pottery Knoll 42Ka1568, Trench 91-3	-	4	21	.84	-	
A.D.1040-1290	Pottery Knoll 42Ka1568, Room 12						
A.D.1000-1245	Pottery Knoll 42Ka1568, Trench 7 roof material						

Table 2. Dated sites with red ware. Note: the red ware index is determined by the total number of Shinarump and Tsegi Orange sherds divided by the Shinarump count. The grayware index is the combined plain and corrugated sherd count divided by corrugated.

Shinarump Red Ware

Among the earliest dates for Shinarump Red Ware (SRW) near the Grand Staircase are the luminescence determinations from plaza style pueblos in the White Knolls locality of the Paria Plateau (Figure 4). The most precise ages are A.D. 1130+/-60 for a undecorated Shinarump red ware sherd and A.D. 1160+/-60 for a Nankoweap Polychrome sherd (Table 2).

UW Lab #	Site	Sample #	context	type	Calendar date
UW2838	Perfect Plaza AZ C:5:4	1	Residential room	Washington Corr	1140+/-60
UW2839	Perfect Plaza AZ C:5:4	2	Sheet Midden	Nankoweap Poly	1160+/-60
UW2840	South Butte AZ C:5:11	3	Courtyard	Shinarump r/w	1130+/-60
UW2842	Yellow Butte AZ C:5:17	5	Courtyard	Nankoweap Poly	1060+/-340
UW2845	White Butte AZ C:1:15	8	Midden/talus	Shinarump r/w	940+/-380
UW2846	Bee Hive Bt AZ C:1:91	9	Darkened soil	Shinarump b/r, (Deadmans b/r?)	920+/-80

Table 3. Paria Plateau White Knolls locality luminescence study results.

These dates correspond reasonably well with SRW sherds from the fill of the deep kiva-like pit structure at the Corngrowers site located on the bank of Short Creek in Mojave County. The pit structure, which is the only dated feature on this complex courtyard style pueblo yielded a tree-ring date of A.D. 1148+/-v. All 13 sherds were Shinarump Red Ware (typed by Richard Thompson) deposited sometime after, perhaps well after, the apparent tree-ring construction date. At the nearby Reservoir site a deep, earthen pithouse with a C14 age on wood of 670+/- 90 BP (Beta33812) held a sizable collection of red ware (Billat 1998). Allison reports 91% was Shinarump Red Ware (Table 2). Of 3,014 gray ware sherds 86% percent were North Creek Corrugated, only a trace (7) were Shinarump corrugated, with the remainder made up of nearly equal amounts of Moapa corrugated and plain (Allison 1998).

On the east end of the Grand Staircase in the Kitchen Corral drainage, the Arroyo site, dated to Late PII and PIII times, has yielded the largest collection of red ware sherds (500+) in the region. Perry (2012) reports three quarters of the sherds were Shinarump Red Ware, 25% Tsegi Orange. Floor context sherds dated well into the 13th century are 100% SRW (Table 2).

Pottery Knoll (42Ka1568), a complex plaza pueblo, lies a few kilometers north of the Arroyo Site. The University of California Long Beach field school excavated two rooms and several trenches yielding several late (PIII) radiocarbon dates (Morley 1993). A recent review of red ware sherds from floor contexts indicates that Shinarump accounts for 80-90% of the collection (Table 2).

At the Gnatmare site (42Ka1978) on the far eastern edge of the Grand Staircase section, Pat Dean reported 91% SRW and 9% TOW, a number identical to the Arroyo site (Table 2). Eighty-six percent of the gray ware sherds were corrugated. Gnatmare's three radiocarbon dates on charcoal place the occupation in the 1200's (Metcalf 1981). Consisting of only a deep earthen pithouse, a surface residential room and no obvious store rooms, the layout of this site is somewhat anomalous.

Discussion

Based on existing dates, Shinarump is the dominant red ware on the Grand Staircase during Pueblo III times. Its beginning date, however, is less clear. There is general agreement that SRW is made of similar materials as Shinarump gray and white ware types (Allison 2007, Lyneis 1998, Neff et al. 1997). Shinarump corrugated and white ware appear by A.D. 1100 at Cotton Canyon Cliff Dwelling (42Ka1504) in association with Tsegi Orangeware (Wilson 1989). Shinarump Red Ware appears to succeed Tsegi Orange Ware but by how long is not at all clear. Assuming that 42Ka1504 (and similarly dated nearby sites) continued to be occupied for a decade or two after A.D.1100, the beginning date for SRW could be as late as A.D.1130, a date supported by direct dating of a Shinarump redware sherd on the Paria Plateau (Table 2). Sometime after A.D.1150 SRW is well established as the dominant red ware on the Grand Staircase. During Pueblo III times only small quantities of Tsegi Orange occur on the dated sites (Table 1). Although Nankoweap and Citadel Polychromes (Figure 5) sometimes co-occur on large sites [see MNA Table 3 (1967), Table 4 (1968)], based on available dates, the production of Nankoweap Polychrome may not have begun until nearly 60 years after Citadel was introduced to the area - a sequence which raises the question of just what was the relationship between Tsegi Orange Ware and Shinarump Red Ware?

Allison suggests; "Shinarump Red Ware production probably begins about the same time as Tsegi Orange Ware production, and it might be reasonable to consider it a regional variety of TOW made with distinctive raw materials" and also that the early type "Medicine/Deadmans designs are present but uncommon, while Dogoszhi-style designs are common" (Allison 2007:24). The 2007 NAU ceramic conference recognized four Shinarump Red Ware types: 1) Kanab Black-on-red (Medicine/Deadmans), Middleton Black-on-red (Dogoszhi-style hatching), Middleton Polychrome (hatched designs and partial slip similar to Cameron), and Nankoweap Polychrome (Citadel Polychrome-like). While Shinarump Red Ware types have been considered "cognates" of Tsegi Orange types (Allison 2007:24), it is not clear whether they are actually temporal equivalents. Based on Amblers (1985) date ranges, all three Tsegi types including Medicine Black-on-red (A.D.1050-1115), Tusayan Black-on-red (A.D. 1050-1210) and Citadel Polychrome (A.D. 1100-1160) overlap about A.D. 1100. The dates presented in Tables 1 and 2 suggest that Shinarump Red Ware types, while derived from Tsegi styles, begin later. An apparently undecorated type occurs but it is unclear whether it is a true cognate of the undecorated type Tsegi Orange (Figures 6 and 7). Rather than forming a sequence, it is possible that all three styles were copied about the same time during the early A.D. 1100s.

The latest dates for the Pueblo III period on the eastern Virgin region fall well into the thirteenth century (Table 1). On these sites high corrugated percentages correspond closely with high Shinarump Red Ware frequencies with both approaching 90%. These high frequencies also occur on plaza style pueblos as far west as the St George Basin: at Three Mile Ruin, an apparent plaza layout, Aikens reports 88% of gray ware (North Creek) to be corrugated and 100% of red ware to be Middleton types (Aikens 1965:100). Elevated frequencies of corrugated and SRW, particularly when combined with plaza or courtyard pueblo layouts, should allow Pueblo III sites to be reliably identified from surface evidence in the eastern Virgin region and perhaps the St. George Basin as well.

Geographical Distribution

Having bracketed the earliest and latest dates for Shinarump Red Ware on the Grand Staircase, this section presents extensive survey data from both the Grand Staircase and adjacent areas with the aim of defining the geographical extent of Shinarump Red Ware and the more limited areas of its production.

Grand Staircase Section Surveys

The Seaman Wash and Fin Little Inventories were large, intensive surveys aimed at high density, archaeologically sensitive areas east of Kanab (McFadden 1996, Lyneis 1996). Of a total of 381 sites, 203 (53%) were classified as Late Pueblo II. It seemed then, as it does now, that the sheer quantity of ceramics on many of these sites argued for a longer Late Pueblo II occupation than 100 years (A.D. 1050-1150). Large ceramic collections from the sites were processed by Barbara Frank and Richard Thompson at the Southern Utah University (SUU) Archaeological repository. Thompson intended to analyze the collections but unfortunately passed away before he could do so. This was a setback for local ceramic studies because Thompson was interested in pursuing the distribution of Shinarump pottery in general, and was particularly interested in local red wares (Walling and Thompson 1988, 2004).

The inventoried sites were recorded between 1988 and 1993 using the standard Intermountain Antiquities Computerized Site Form (IMACS) which allows itemizing ceramic wares and their types as well as quantification (in groups of 1-9, 10-25, 25-100, 100-500 and 500+). Using these rough estimates 60-70% of the red ware was classified as Tsegi Orange ware, 30-40% was Middleton i.e. Shinarump. The surveys focused on four separate localities with suspected high densities of architectural sites (90%) (Lyneis 1996,McFadden 1996). The localities, located within the agricultural zone, offered differing agricultural opportunities in terms of elevation (5,000' - 6,100'), variable soils, and settings with potential for various degrees of both dryfarming and alluvial outwash techniques. Each of the four localities was occupied over the entire span of Puebloan occupation in the region. Although single component sites occurred during all periods, a salient characteristic was the multi-component nature of the sites visible in terms of multiple roomblocks and cist alignments with associated ceramics often discernible as discrete middens or as palimpsests of late types on more generalized scatters of plain gray. For example, Basketmaker III sites with superpositioned Late PII roomblocks were common suggesting reuse of arable settings after hundreds of years. Just as often, however, Late PII sites seemed to have long sequences of occupation. For example, excavations at 42Ka3328 what appeared to be an "L" shaped unit pueblo (see Figure 109 this volume) demonstrated that it was not constructed as a unit but over time as sequentially constructed rooms.

Identifying the production zone for Shinarump Red Ware on the basis of its frequency in surface collections on Grand Staircase sites is subject to peculiar form of sampling error. Because many of the sites had long occupational histories, spanning both Late Pueblo II and Pueblo III periods, the surface sample potentially has a mix of pottery from both periods i.e. Tsegi Orange and Shinarump Red. On disturbed sites, as nearly all are, the problem is exacerbated. The most likely result of this potential bias would be an elevated TOW count on a PIII site with the earlier Late PII component. A second source of bias could result from disturbed burials. The few burials excavated in the area often include at least one red ware vessel or 15-20% of the total. Large, privately held collections of complete vessels from east of Kanab, apparently obtained from burials, appear to have higher percentages of redware (42Ka3055, 42Ka3557 (15%). The overall percentage of red ware from the Arroyo site excavations was a relatively low 4% (Table 1).

The Analysis. Although the survey collections were not systematic, the red ware types collected should be representative and suitable to demonstrate cultural affinity and the intensity of occupation during the Late PII period and Pueblo III periods. With that in mind, a review of 148 Late Pueblo II and Pueblo III sites with red ware collections curated at Southern Utah University was undertaken. A small group of archaeologists including Barbara Walling Frank, Gardiner Dalley, David Van Alfen, GERALYN McEwen, Connie Reid, Britt Betensen, William Banek, Roger McPeck and the author carried out the analysis at the Southern Utah University Archaeological Repository May 28, 2014.

Collections from 77 of the 148 Pueblo II/ PIII sites were reviewed by the group. Descriptions for Tsegi Orange Ware were based on commonly accepted criteria (M. Lyneis personal communication 2014; Geib 2004; Allison 2007; Collette 2014). The primary criterion was the presence of white angular (sherd) fragments - WAF. Sand tempered red ware without WAF was considered Shinarump Red Ware. San Juan Red Ware was identified by the presence of black inclusions (andesite?). Five microscopes (10x45) were available as needed.

The results were significantly different from the site form tallies which suggested that TOW was the dominant type in the survey areas. Of 602 sherds, 534 (89%) were typed as Shinarump Red Ware, 68 (11%) were Tsegi Orange ware with only a trace (1) of San Juan Red Ware. Classification of sherds to the level of type level was not part of the analysis but Medicine Black-on-red, Tusayan Black-on-red and Citadel Polychrome were present along with their Shinarump counterparts. It is probably fair to say that the majority of sherds showed no painted designs at all.

One implication of this (essentially reversed) frequency relationship is that Kayenta contact in the study area was not as intense as we thought. Another possibility is that the high count of Shinarump is a measure of lateness, i.e. most sites are actually Pueblo III. A third is simply that we were dealing with a skewed sample; these sites were frequently - all too frequently, badly disturbed by looting but as mentioned above, churning of the deposits would more likely have resulted in elevated TOW frequencies rather than a reduced one. It seems most likely, however, that the frequencies, which are about the same as the Arroyo site, represent an initial Late PII presence and a more intense post A.D. 1150 occupation.

Why the TOW/SRW frequencies were reversed was, in part, a matter of definition as well as greater precision over the field ID's as a result of using microscopes. What became apparent very quickly during the analysis was the amount of variation in both paste color and temper of the Shinarump sherds. Orange/red sherds with gray cores, variable sand temper, and apparent gray sherd temper in some, contrasted greatly with "classic" brick red Shinarump with a snap fracture, fine quartz sand temper, often vitrified, and frequently with a dark core. The former "variety" were apparently the sherds field typed as Tsegi Orange during the surveys.

The utility of identifying two Shinarump Red "varieties" is probably not justified at this point but it is an identification issue and possibly a typological one: Questioning the significance of the apparent use of gray sherd temper (GAF?) rather than white sherd temper (WAF), one of the participants suggested that the "oranger" variety might be a better fit as a local Tsegi type rather than a Shinarump type! In the end, however, if the constituent clay and sand temper is the same, and both types are locally produced, the range of variation is probably acceptable for classification purposes. The issue of raw material availability and its potential variability is discussed in the analysis section below.

Kaiparowits Plateau Surveys and Excavations

There is little dispute among researchers that, based on ubiquity alone, the Grand Staircase section was a center of distribution for Shinarump Series in general and red ware in particular. Consequently, if it is found outside the area, it is considered exotic and either a comment on exchange networks or actual population movement; Fiftymile Mountain is such an area.

Fiftymile Mountain was occupied by the Fremont until about A.D.1050 and subsequently a much more intensive Anasazi occupation into Late Pueblo II times. The University of Utah's Glen Canyon investigations conducted an extensive survey and excavated 11 sites (Gunnerson 1959: Fowler and Aikens 1963). The origin of the Anasazi occupation was a confused issue. Florence Lister summed up the situation stating that Gunnerson believed the occupation was a result of "Kayenta peoples from the west" (based on Virgin Series Whitewares) and Lister's view of "Kayenta people migrating directly to the Kaiparowits" (Lister 1964:75). This was based on her assignment of the same pottery to a generalized, but Kayenta affiliated, Southern Utah Series. These muddled positions on just *who* the Anasazi were and what direction they came from, were taken just prior to Aikens' extensive excavations in the Virgin region. Concluding his discussion of Virgin ceramics, Aikens makes the case that Southern Utah Variety, Tusayan White Ware should indeed be considered as Virgin affiliated - a position he thought Lister was also open to (Aikens 1965:99). Lister is, however, equivocal about the origins of San Juan Red Ware, Little Colorado Series (i.e. SRW) as "evidence for Virgin River influence" and was surprised at its prevalence at both the Coombs site and the Kaiparowits Plateau (Lister 1964:48). Later she opines that Middleton reds are actually a Kayenta type - essentially local at Coombs and therefore "should not be interpreted as western trade items" (Lister 1964:74). At issue here was whether ubiquity equals local production; apparently Aikens' (1965) sizable Bonanza Dune red ware counts were not yet available.

A recent sample survey of the Kaiparowits Plateau, which excluded Fiftymile Mountain, found Shinarump Red Ware to be the dominant type (Geib et al. 2001). This was the assessment of a seasoned crew with extensive experience in *both* the Kayenta and Virgin regions. In support of a Virgin affiliation they pointed out that "Tsegi Orange Ware would have been an import originating from roughly 80Km southeast of Collet Top in the Rainbow Plateau and Paiute Mesa where the closest production centers for this pottery are located" (Geib et al 2001:272). This was a possibility they did not consider very likely.

There now seems to be general consensus that most of the ceramic evidence from the Kaiparowits supports close contact with the Virgin region. Still, how do we account for the presence of nearly equal amounts of Tsegi Orange and Shinarump r/w present on fairly small, short-lived sites on Fiftymile Mountain (Table 4)? Lister had a valid - and still uncontested point, that TOW *was* made in the Kayenta region. An reasonable scenario simply routes the transmission of Tsegi Orange through the Grand Staircase - or eastern Arizona Strip, *along with* a predominately Virgin assemblage. Based on ubiquity, the vessels suggest population movement to the Kaiparowits, rather than an exchange network.

Site (name)	SJRW	TOW	SRW	Total sherd #	Site type
42Ka331	-	4	23	576	"L" shaped pueblo
42Ka761	-	-	49	249	Pueblo
42Ka346	-	31	47	599	Masonry rooms
42Ka543	-	10	-	212	Field house
42Ka524	-	-	17	1179	Pithouses
42Ka526	-	34	13	482	Field house
42Ka528	-	56	16	440	Field houses?

42Ka544	-	4	-	53	Rock shelter
42Ka368	-	36	15	535	Masonry rooms
42Ka354	-	31	39	775	Mudholes "Pueblo"
42Ka539	-	1	2	112	Masonry pit structures
TOTALS	0	207	221	5,244	

Table 4. Red ware frequencies on Fiftymile Mountain excavated sites (Fowler and Aikens 1963).

Discussion. A review of grayware sherds from the Fiftymile excavations indicates 79% are corrugated - a percentage similar to the Grand Staircase. This includes the plain gray type that was originally classified as Kiet Siel Gray. Aikens later suggested that this type be considered North Creek Gray and therefore reflects a southwest Utah influence (Aikens 1965:93). Red wares of some sort make up 8% of the total collection. The high relatively high percentage of TOW (48%) suggests an early to mid A.D. 1100s date for most of the excavated sites. Surveyed sites had a much higher frequency of SRW suggesting a later, PIII occupation. Recent radiocarbon and tree-ring dates indicate the occupation extended to at least A.D. 1200 (see Figure 177, this volume).

The Tank Hollow Burn survey (McFadden 2003) recorded an interesting cluster of field-houses and residential sites, apparently without storage rooms, not unlike those excavated by Aikens and Fowler (McFadden 1982). Of 28 red ware sherds collected, 24 (86%) were SWR. The Window Sash Bench Inventory recorded a series of small pueblos near Collet Top, an arable setting just north of Fiftymile Mountain (McFadden 1982). A recent review of the collections identified 5 TOW and 44 SRW sherds which not only supports the contention of a Virgin presence as Geib et al proposed, but suggests it occurred sometime after A.D.1150.

Expectations for a reduced frequency of redware based on distance from the source have not been borne out. About 8% of the sherds from excavated sites on Fiftymile Mountain were either TOW or SRW. Yet, it is unlikely that Shinarump of any type (or TOW for that matter) was made on the Kaiparowits Plateau. If the Grand Staircase is the source of the Shinarump Series- what accounts for the nearly equal frequencies of TOW and SRW? The proximity of Kayenta communities just south of the Colorado River, as Lister (1964) suggested, is one possibility - either via exchange or actual population movement. There is, however, little evidence for Kayenta contact in terms of the overall ceramic assemblage after about A.D.1150. The explanation most congruent with the proposed red ware chronology is that the Anasazi occupation on Fiftymile Mountain spanned the 12th century resulting in an assemblage similar to that on Grand Staircase: early in the century Tsegi Orange Ware was the sole red ware type in use, by A.D. 1150 Shinarump Red Ware became the dominant type.

Coombs Variety Tsegi Orange: Shinarump Red Ware is not the only red ware made north of the Colorado River. In fact, a classification of redwares based largely on temper, ignores the locally produced basalt tempered Coombs Variety of Tsegi Orange (Lister 1964). Lister, noting the relatively high number of San Juan Red Ware sherds (i.e. Shinarump) and vessels at Coombs, suspected they originated to the west and were Virgin affiliated. She states; "Such representation of San Juan Red Ware is impressive when it is realized that Coombs potters made their own versions of Tsegi Orange Ware and imported others from Kayenta-allied towns elsewhere"(Lister 1964:48). (But see her later contention that Middleton Reds are not Virgin (Lister 1964:74).

Coombs Variety is relevant to the discussion because, as a *local* redware, its initial production could well parallel the trajectory for Shinarump redware. This is a fascinating topic that can't be pursued here other than to note that the Coombs tree-ring dates range from A.D. 1129v to A.D.1165vv and the frequency of TOW, including locally made Coombs Variety, is relatively high (Table 4). To my knowledge,

whether frequencies of local versus imported versions of Tsegi change over time, just as Shinarump Red Ware seems to replace Tsegi Orange on the Grand Staircase, has not been investigated.

The Eastern Arizona Strip Surveys (House Rock Valley and the Paria Plateau)

Pleasant Valley Outlet, located in central House Rock Valley, is a distinct locale with a cluster of Late PII "L" shaped roomblocks and less formal, accretionally constructed pueblos. Both are associated with a series of field houses and agricultural terraces in an alluvial outwash setting. Only a few sherds were collected but the ceramic assemblage is described as basically Shinarump and Virgin series with Black Mesa, Sosi and Dogoszhi styles common and few, if any, Flagstaff b/w designs. Red wares were neither numerous nor quantified but did include both Tsegi Orange and Shinarump Red Wares. Types collected include a small undecorated Shinarump Red sherd, Medicine Black-on-red and Citadel Polychrome. The assemblage was believed to fall within the range A.D. 1100-1150 (McFadden 2004).

The Museum of Northern Arizona (MNA) survey of the Paria Plateau and House Rock Valley (Mueller 1974) produced somewhat more Tsegi Orange (30%) than the Grand Staircase section as well as a sizable collection of Shinarump Red Ware (70%). Other tables provided by Dave Wilcox indicate much higher percentages of TOW in House Rock Valley (Table 5). Whether these wares segregate suggesting a sequence, or if there is a consistent mix of the two suggesting they were truly contemporary, is not known. The MNA analysis relied on the presence of WAF along with sand temper to identify TOW - as did Lister on the Kaiparowits Plateau but a review of both collections might be instructive. It may be that by virtue of simple proximity to the Kayenta production areas, that Paria Plateau/House Rock Valley area was a conduit for exotic pottery into the Virgin region from east of the Colorado River.

A more useful indicator of cultural identity on the eastern Arizona Strip than counts of exotic red and white ware might be identification of the basic utility type used on the eastern Kaibab, Saddle Mountain, and House Rock Valley. Suitable clays for pottery have not been identified in these areas. In the absence of a locally made utility type, where did the everyday pottery originate? Impressions at this point are that both light pasted, apparently Virgin Series and Shinarump Gray and White Wares are most common. This is also seems to be the case on the Paria Plateau (Mueller 1974).

PERIODS	SURVEY	SJRW	TOW	SRW	r/w index
BMII-PIII	SWI/FLI (Sample of 79 PII/III sites)	1	11% (n-68)	89% (n-534)	.89
L.PII-PIII	Kaiparowits Plateau Sample (Geib et al 2001) 24 sites w/red	0	5 sites w/ TOW Sherd#s?	23 sites w/ SRW 80%+ Sherd #s?	.80+
L.PII - III	Collet Top Survey (16 sites)		5 sherds	44 sherds	.90
L.PII-PIII	Fiftymile Mt. Survey (Fowler and Aikens 1963)	0	29	118 (80%)	.80
L.PII-PIII	Lister (1964:74)	-	198	343	.63
L.PII-PIII	Fiftymile Mt. Excavations (Fowler and Aikens 1963)	0	48% (207)	52% (221)	.52
L.PII-PIII	Tank Hollow Burn	0	4	24	.86

PI-PIII	Paria Plateau (Mueller 1974)	36	30% (318)	70% (735)	.70
PII/III	Paria Plateau (Wilcox table 4)	61?	245	135 (64%)	. 64
PII/III	HRV (Wilcox table 3)	0	(n-121)	(n-38)	. 25
LP/PIII	Coombs Excavations (from Lister 1964)	?	(n-1682) + 17 vessels both local and exotic	(n-813) +10 vessels	.32

Table 5. Regional survey and excavation tabulations of red ware.

The Production Zone and Raw Material Availability

Close proximity of suitable clays and tempering materials for making everyday pots, to the populations that used them, is usually considered a given. This seems to be especially true for the Shinarump wares which are generally assumed to have been made on site (Wilson 1985; Neff et al 1996, Perry 2012). But it is becoming apparent that large portions of the study area do not produce suitable clays for making pottery at all. Where did they get their pottery?

Several studies indicate that Shinarump gray, white, and red wares were made with the same clays and tempering materials (Lyneis 1998; Neff et al. 1997; Perry 2000, 2012; Wilson 1986). If so, it follows that the highest frequencies of Shinarump pottery should be found near a suitable source of clay and temper. That source has long been suspected the Chinle Formation (see Lyneis 1998, Wilson 1985). Chinle clay exposures are found at the base of the Vermilion Cliffs and, perhaps significantly, are available as stratified, vertical exposures in the areas with high site densities (up to 41 per square mile). On the Grand Staircase these exposures are often in close proximity to Shinarump conglomerate (and Moenkopi Sandstone) which produces a coarse sand ranging from cemented conglomerate to variously sorted, perhaps inevitably mixed, sand which is a good candidate for Shinarump temper. Exposures of Chinle are also nearly continuous along the base of the Paria Plateau, although the conglomerate sandstone is mostly restricted to the area around Lees Ferry. The following analyzes are not specific to redware but to the Shinarump series in general.

Thin-Section Analysis and Refiring Results

Lyneis believes it is the clay which "sets off the Shinarump types from North Creek gray "(Lyneis 1998:11). In her analysis of sherds from across the eastern Virgin region vitrification (apparently an expression of the amount of iron as a flux), siliceous microfossils she called "undulating chunks" and firing red in an oxidizing atmosphere were identified as local traits. Samples from the eastern Arizona Strip including: House Rock Valley, Paria Plateau, Kaibab Plateau, and the Grand Staircase section: Johnson Canyon, Seaman Wash, and Kitchen Corral all had a strong tendency to refire various shades of red (Lyneis 1998). Less than half the sherds from Utah had the siliceous microfossils but elsewhere they were common. Lyneis didn't believe they were diagnostic of Shinarump per se, but thought they might be a useful indicator of a clay source or its variability.

Perry (2012:84) conducted refiring experiments on 41 sherds from the Arroyo site in the Kitchen Corral drainage. Nearly all refired to a shade of red. Although all were typed as "local" rather they compared favorably with Shinarump wares. Three light pasted sherds fired pink/white and probably represent Tusayan White Ware. While the range of refired colors suggested to her that a variety of clay sources were used, they also indicated that plain, corrugated, painted, and red pottery used similar clays (Perry 2012).

Experimental Firing

Lyneis conducted an experimental pottery firing using purple and pink Chinle clays obtained from a vertical exposure of the formation at the head of Petrified Hollow which borders the Seaman Wash Inventory. The goal was to assess their suitability to produce Shinarump pottery. Fired in an oxidizing atmosphere the vessels were not much different in color from the raw clay and were of questionable strength. Still, the initial firings were promising and Lyneis thought one or both clays could have been used to produce Shinarump-like pottery (Lyneis 2009).

Neutron Activation Analysis (NAA)

Larson's NAA study of pottery from the University of California Long Beach field school site, 42Ka1576, did not use a standard ceramic classification scheme, rather, he grouped his sample of 206 sherds into whiteware, corrugated, plain, polychrome and red ware categories. In addition, three Chinle clay adobe fragments were analyzed. The study's objective was to determine which categories, or subsets of them, were local and which were manufactured off-site i.e. to "provide a framework for examining the patterning of compositional and formal diversity in Pottery Knoll's ceramic assemblage" (Neff et al. 1997:481).

Nearly all sherds fell into 2 groups; Ref 1 or Ref 2 with three sherds making up a homogenous group designated Red 1 (Neff et al. 1997:479). The authors interpreted Ref 1 was highly variable but included the local adobe sample of Chinle clay within it; Ref 1 was therefore considered local. Ref 2 and Red -1 were chemically distinct from Ref 1 and were considered to be made of nonlocal clay, however, Ref 2 was said to subsume "pottery derived from two distinct but related sources outside of the immediate vicinity of Pottery Knoll" (Neff et al. 1997:481). In order to make their study relevant to our concerns here, sherds from the studies reference collection (at present housed at the GSENM headquarters) were reviewed and classified according to standard definitions of ware and type (Allison 1997). Findings were as follows:

Ref 1 includes Shinarump corrugated, Nankoweap Polychrome (Figure 5) and Shinarump b/w and a subset called Poly 1 that appears to include both "classic" and a more variable variety of Shinarump Red Ware (see FLI/SWI results).

Ref 2 includes both Virgin series and Shinarump series i.e. subset (a) consists of Virgin series black-on-white, North Creek Corrugated and plain. A second category, subset 2b, is Shinarump series and includes Shinarump red ware, Shinarump Gray (plain), and Shinarump Black-on-white.

The outlier Red 1 group has only 3 sherds that, while they appear to be Shinarump Red Ware, have tiny shiny black angular inclusions suggesting a different temper source (Coombs Variety?).

Interpreting the neutron activation analysis is beyond the scope of this section but their data suggests that there is sufficient variability in the clays used to make Shinraump red, gray and white wares for them to fall into *both* of the primary compositional groups. Assuming they are correct about Ref 1 being local (which included the adobe samples); that our typing of the sherds is correct (they are available for inspection); and further, that the Shinarump samples are indeed made of Chinle clay, there appears to be significant variation in the makeup of Chinle clays in the region. This is taken as evidence for either local variability as a result of stratified exposures of Chinle and/or geographical variability between subareas of the eastern Virgin region. At any rate, the NA analysis supports the notion that Shinarump was locally made in areas where the Chinle Formation is exposed.

Discussion

As the survey data indicates, the geographical range of Shinarump pottery extends over *all* of the eastern Virgin region. However, if Shinarump pottery was made of Chinle clay, its potential area of production is much more limited. It should be fair to say that when relatively high percentages of Shinarump Series and Red Ware occur in non-production areas, that those areas can be considered culturally related settlements.

Both excavation data and IMACS site forms indicate that Shinrump Grayware was generally the dominant utility type on the eastern Grand Staircase by Pueblo I and Early Pueblo II times. These sites are common and make up about 30% of the total site count (116 of 381) (McFadden 1996). Classic Shinarump Grayware initially occurs on Basket Maker III and Pueblo I sites with increasing frequency though Early Pueblo II. That said, true Shinarump can be difficult to identify resulting in graywares from excavated sites in the Kitchen Corral drainage simply been termed "local" (Perry 2000, 2012). Whether they should be considered Shinraump "light" or a local version of North Creek, is problematic. Refiring of sherds from Park Wash and Road Kill sites (Table 1) could probably resolve the question of whether they should be considered Virgin or Shinarump Series. It is worth noting that during these early periods white wares are virtually all Virgin Series (Dead Raven is a good example of this); by Late Pueblo II heavy slips are applied to Shinarump White Ware making painted designs feasible.

Table 1 illustrates how the distribution of Shinarump Series changed through time - or more accurately how little it did. Johnson Canyon was the westernmost extent around A.D.1000 and for the next 100 years that boundary didn't change as evidenced by its total absence at 42Ka6293 and only a trace at the Kanab site Nickens and Kvamme (1981) . By the early A.D. 1100's, excavations at 42Ka1504 produced 1,971 grayware sherds of which 62% were corrugated: of the 600 Shinarump Gray Ware sherds, 74% were corrugated. Based on the presence of Tsegi Orange Ware as the sole red ware, it appears that Shinarump white and corrugated types *preceded* the development of Shinarump Red Ware.

Towards the west side of the Grand Staircase physiographic section, the Pueblo III Reservoir site along Short Creek produced only a trace of Shinarump corrugated and no white ware - even while 91% of the redware was Shinarump (Allison 1998:9.20). These frequencies indicate that the Shinarump pottery was not locally made west of Kanab Creek. On the opposite side of the Grand Staircase the Pueblo III Gnatmare site also had 91% Shinarump Red Ware but here Shinarump corrugated accounted for 22% of the total grayware and was probably locally produced. This suggests that during Pueblo III times Shinarump Red Ware dominated in both trade and local contexts on the Grand staircase.

To the south on the Paria Plateau, Shinarump White Ware and Red Ware are common although most gray ware was assigned to the Virgin Series (Mueller 1994:20-21). Given more recent investigations on

the plateau it is suspected that this is a classification problem rather than true absence. There seems to be a relatively strong association of Shinarump Red with both whites and grays at Pleasant Valley Outlet in House Rock Valley (McFadden 2004) and apparently on Saddle Mountain as well. On the west side of the Kaibab Plateau the South Slide Canyon intensive surveys just east of Kanab Creek had some Early PII and Late PII sites where Shinarump pottery dominated or was at least present in considerable numbers (McFadden and Keller 2007). Based on the lack of local clay and temper sources it seems likely that virtually all the pottery was imported.

The Logistics of Pottery Production and Distribution

One of the observations Margaret Lyneis (2009) made regarding her firing experiments with Chinle clay was how much fuel it took! Fuelwood, probably juniper, in addition to clay and temper, is the third resource necessary to produce pottery. Given the non-specialized, apparently family-based nature of pottery manufacture in the Virgin region, it is common to assume production was on-site, or close by (Wilson 1985, Larson 1996). Actual evidence for on-site firing, however, is slim to nonexistent: Larson described on-site Chinle clay sources at Pottery Knoll (Larson 1996); a deformed vessel from the BMIII site 42Ka1796 (see Figure 30, this volume) may have been fired within a collapsed pithouse, although this possibility wasn't entertained at the time; at 42Ka4820 a jar of sand similar to the temper in that site's pottery was found on the bench of an early Pueblo I pithouse. Firing large numbers of vessels must have had a substantial footprint, to date however no kilns or features either on or off site have been reported in the Virgin region - so it is a moot point. At any rate, the proposed Grand Staircase production zone had all three resources in abundance and would have made an ideal setting for the production of Shinarump pottery in quantity over the entire span of the Formative Period.

This was not the case for localities on the eastern Arizona Strip that *seem* to have a preponderance of Shinarump Series pottery (but also assemblages including both Virgin and Kayenta wares). On the Paria Plateau fuelwood was probably abundant but Chinle clay and temper resources occur only along the base of the Vermilion Cliffs. Transporting the raw materials to the fuel wood, rather than vice versa, would have been the most efficient production strategy. In portions of House Rock Valley, such as Pleasant Valley Outlet (McFadden 2004), both fuel wood resources as well as production materials were at a distance making transport of finished vessels to those sites probable. On Saddle Mountain firewood was abundant but the underlying Kaibab Formation did not provide the raw production materials. Nor has any local pottery been identified on the Kaibab Plateau (but see Jones 1986:134 for an alternative view; also Roger McPeck pers. comm. 2015). Gray ware assemblages there include variable frequencies of both Tsegi and Virgin Series Tusayan Gray Ware but it may be that Shinarump Gray Ware is the dominant type. It is argued here that while diagnostic, and particularly exotic sherds, are important indicators for culture contact and dating, it is the utility pottery that establishes the more useful "baseline" for establishing social identity.

In the absence of a local production capability over large portions of the eastern Arizona Strip, the likely source of this large amount of everyday utilitarian pottery was probably the Grand Staircase section. A second probable production zone, during Late PII/III, is the Paria Plateau where clay sources, temper and fuel wood resources converge.

Conclusions

If longevity, ubiquity, high frequencies, and availability of raw material sources are the basis for establishing the production zone of the Shinarump Series pottery, including Shinarump Red Ware, the Grand Staircase is the optimal setting for the production zone. In fact, we might assume that the ware was made on or near sites wherever suitable Chinle clays were found. This zone extends along the base of the Vermilion Cliffs from Kanab Creek east to the Paria River. The area coincides with a moderate density of sites during the Early PII period (A.D. 900-1050/1100) and experienced a rapid increase in site density during the succeeding Late Pueblo II period. Given the nature of Virgin social organization, there is little reason to believe that the production of red pottery was specialized and restricted to select areas or sites within this zone, and good reason to assume that its distribution was continuous on Late PII/III sites along the base of the Vermilion Cliffs.

Turning to the eastern Arizona Strip, if the temporal sequence for red ware is valid for this area, it can be argued that the predominance of Shinarump Red Ware on the Paria Plateau, is simply a consequence of close contact with the Grand Staircase after A.D. 1150 - when SRW becomes dominant. There are, in fact, a large number of stylistically similar Late Pueblo II sites in both areas that, it has been proposed, had a close social and probably economic relationship (McFadden 2012).

A second possibility is that Shinarump pottery was produced in multiple locations. If so, Chinle clay sources located along the base of the Paria Plateau between House Rock Wash and Lees Ferry are a good possibility for a second production zone. A case can be made that importing Kayenta, Virgin and Shinarump Series pottery, each originating in distant production areas but present in a number of localities i.e. Saddle Mountain, House Rock Valley and the Paria Plateau, is not only a logical solution for obtaining pottery in a clay poor region, is also a measure of social/economic interaction. Given the proximity of these localities to the proposed Paria Plateau production area, we might expect Shinarump Series to be the dominant type on the eastern Arizona Strip. Although apparently restricted to Late PII/III times, the local production of gray, white and red wares parallel - and perhaps were inspired by, the production of Shinarump pottery on the Grand Staircase. The (apparent) higher frequencies of Tsegi Orange Ware on the eastern Arizona Strip, relative to the Grand staircase, might be a result of: 1) an early occupation (circa A.D.1100), 2) simple proximity to the Kayenta production areas, or 3) some sort of special relationship with Kayenta peoples. Accounting for the reason red ware frequencies vary over time and space on the eastern Virgin region and beyond cannot be properly addressed without a better understanding of the social dynamics and economic processes at work in the region around A.D. 1100. Based on the above assumption that ceramics - especially utility wares, are closely tied to social identity, our emphasis should not focus solely on "diagnostic" white wares so much as attempt at good characterization of utility wares and the settlement contexts in which they occur. Future surveys on the Kaibab Plateau, House Rock Valley, Saddle Mountain, and Paria Plateau will provide excellent opportunities to test the issue of social identity by employing appropriate sampling techniques to quantify utility ware frequencies.

A model congruent with both the existing chronological data and settlement history of the eastern Virgin region might go something like this: Tsegi Orange Ware is introduced to the Grand Staircase east of Kanab just prior to A.D. 1100; the Early Pueblo II population at this time was relatively low but expanded rapidly during the first decades of the Late Pueblo II period A.D.1050/1100-1150. Sometime after A.D. 1150, when contact with the Kayenta stopped and the source of Tsegi Orange Ware was cut off, local redware production on the Grand Staircase and along the base of the Paria Plateau, replaced Tsegi Orange Ware entirely. While interaction between the Kayenta and Virgin regions effectively ceased by A.D. 1150, close contact between the Grand Staircase populations and the eastern Arizona Strip, including the Paria Plateau, continued into Pueblo III times. The interaction between these two areas may be one of the causes for Shinarump Red Ware variability noted during the Grand Staircase

review. Variability of Shinarump Red Ware on the Paria Plateau has yet to be addressed. A review of the Museum of Northern Arizona collections from House Rock Valley and the Paria Plateau, and perhaps revisiting the sites themselves, would be a good first step.

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REFERENCES

- Aikens, C. Melvin
1965 *Excavations in Southwest Utah*. University of Utah Anthropological Papers No.76. Salt Lake City.
- Allison, James
2008 Shinarump Red Ware and Other Red Ware Pottery North and West of the Colorado River. *Pottery Southwest* 27: 21-34.
- Ambler, J. Richard
1985 Northern Kayenta Ceramic Chronology. In *Archaeological Investigations Near Rainbow City, Navajo Mountain, Utah*, edited by Phil R. Geib, J. Richard Ambler, and Martha M. Callahan, pp. 28-68. Northern Arizona University Archaeological Report 576, Flagstaff.
- Collette, Jim M.
2009 Shinarump Gray and White Ware: A 75-year Retropective, Part 1. *Pottery Southwest* 28: 2-11. Albuquerque Archaeological society.
- Colton, Harold S.
1952 *Pottery Types of the Arizona Strip and Adjacent Areas in Utah and Nevada*. Museum of Northern Arizona Ceramic Series No. 1. Northern Society of Science and Art, Inc. Report on file at the Bureau of Land Management Kanab Field Office, Utah.
- Geib, Phil R., Jim H. Collette and Kimberly Spurr
2001 *KAIBABITSINUNGWU An Archaeological Sample Survey of the Kaiparowits Plateau*. Utah BLM Cultural Resource Series No. 25. Grand Staircase-Escalante National Monument Special Publication No. 1.
- Hegmon, Michelle, James R. Allison, Hector Neff, and Michael S. Glascock
1997 Production of San Juan Red Ware in the Northern Southwest: Insights into Regional Interaction in early Puebloan Prehistory. *American Antiquity* 62: 449-463.
- Judd, Neil M.
1926 Archeological Observations North of the Rio Colorado. *Bureau of American Ethnology*. Bulletin 82.
- Kvamme, Kenneth L., and Paul R. Nickens
1981 *Archaeological Investigations at the Kanab Site Kane County, Utah*. Excavation of Two Anasazi Sites in Southern Utah. Cultural Resources Series No. 9. BLM.
- Lister, Florence
1964 *KAIPAROWITS PLATEAU AND GLEN CANYON PREHISTORY: An Interpretation Based on Ceramics*. University of Utah Anthropological Papers No.71. Salt Lake City.
- Lister, Robert H.
1959 *THE COOMBS SITE*. University of Utah Anthropological Papers No.41, Salt Lake City.
- Lister, Robert H. and Florence C. Lister
1961 *THE COOMBS SITE Part III, Summary and Conclusions*. University of Utah Anthropological Papers No.41 Salt Lake City.
- Lister, Robert H., J. Richard Ambler and Florence C. Lister
1960 The Coombs Site Part II. *University of Utah Anthropological Papers* No.41 Salt Lake City.

Lyneis, Margaret M.

- 1998 The Shinarump Problem 2. *Plain Ware and Red Ware Adrift on a Sea of Sand*. Department of Anthropology, University of Nevada, Las Vegas.

McFadden, Douglas A.

- 1982 Archeological Clearance Investigation of the Window Sash Bench Chaining - Kaiparowits Plateau. Report on file at the Kanab Field Office, BLM.
- 2004 House Rock Valley Inventory: Pleasant Valley Outlet Tract: An Alluvial fan Outwash System on the Arizona Strip. Submitted to the Arizona Strip Field Office, Arizona State Trust Lands and the Arizona State Museum.
- 2007 Kanab Creek Archaeological Project: 42Ka3831, F18 Burial Excavations. Submitted to the Utah Public Lands Policy Coordination Office.
- 2008 Archaeological Investigations on the Paria Plateau, Vermilion Cliffs National Monument, 2007: The White Knolls Survey, Site Mapping of Selected site at White Knolls and Test Excavations at West Bench Pueblo. Submitted to the Vermilion cliffs national Monument, Bureau of Land Management, St George.
- 2010 Archaeological Investigations on the Paria Plateau, Vermilion Cliffs National Monument 2008 and 2009: The pinnacle Ridge and White Knolls Surveys. Submitted to the Vermilion Cliffs National Monument, Bureau of land Management, St. George.
- 2012 *Excavations at the Arroyo Site, 42Ka3976: A Pueblo II/III Virgin Anasazi Farmstead*. Utah Cultural Resource Series No. 27, Grand Staircase- Escalante National Monument Special Publication No.3. Bureau of Land Management, Utah.

Morley, Selma

- 1993 A Study of the Final Occupation of 42Ka1568: Demographics, Climate and Settlement Pattern Change among the Western Anasazi. Master's thesis on file at the Department of Anthropology, University of California, Long Beach.

Metcalf, Duncan

- 1981 *The Gnatmare Site*. University of Utah Archeological Center. Salt Lake City.

Nash, Robert B.

- 2013 Data Recovery at Sites 42Ka4478 and 42Ka6293 along Kanab Creek Kane County, Utah. Prepared for the Federal Highway Administration and the BLM, Grand Staircase-Escalante National Monument. MOAC Report No.08-04.

Neff, Hector, Daniel O. Larson and Michael D. Glascock

- 1997 The Evolution of Anasazi Ceramic Production and Distribution: Compositional Evidence from a Pueblo III site in South - Central Utah. *Journal of field Archaeology* 24:473-491.

Nielson, Asa S. (Compiler)

- 1998 Excavation/Mitigation Report Three Sites Near Hildale, Utah 42WS2195, 42WS2196, AZ B: 1:35 (BLM) (Reservoir Site) Submitted by Baseline Data to the Utah and Arizona Bureau of Land Management State Offices.

Parry, Laureen

- 2012 Analysis of Ceramic Artifacts In, McFadden, Douglas A. *Excavations at the Arroyo Site, 42Ka3976: A Pueblo II/III Virgin Anasazi Farmstead*. Utah Cultural Resource Series No. 27, Grand Staircase-Escalante National Monument Special Publication No.3. Bureau of Land Management,Utah.

Appendix D

Thompson, Richard A.

- 1995 Analysis of ceramics collected during excavations at the Corngrower site, B: 102: (BLM). Ceramic tabulations on file at the SUU Archaeological Repository, Cedar City.

Tipps, Betsy L.

- 1989 Cultural Resource Investigations near Kanab, Utah: Excavation and Structural Stabilization at Cottonwood Canyon Cliff Dwelling. Cultural Resources Report 421-1-8821. Submitted to the USDI, Bureau of Land Management, Kanab Resource Area Office, Kanab, by P-III Associates, Salt Lake City.

Westfall, Deborah A.

- 1985 Archaeological Test Excavations at the Energy Fuels Nuclear, Inc. Vermilion Cliffs Project, Kane County, Utah. Abajo Archaeology, Bluff, Utah. Report on file at the BLM Kanab Resource Area Office, Kanab, Utah.
- 1987 *THE PINENUT SITE: VIRGIN ANASAZI ARCHAEOLOGY ON THE KANAB PLATEAU OF NORTHWESTERN ARIZONA*. Cultural Resource Series Monograph No.4. Bureau of Land Management. Phoenix.

Wilson, Dean

- 1985 Analysis of Ceramics Recovered During the Vermilion Cliffs Project. In, Westfall, Deborah A. Archaeological Test Excavations at the Energy Fuels Nuclear, Inc. Vermilion Cliffs Project, Kane County, Utah. Abajo Archaeology, Bluff, Utah. Report on file at the BLM Kanab Resource Area Office, Kanab, Utah.

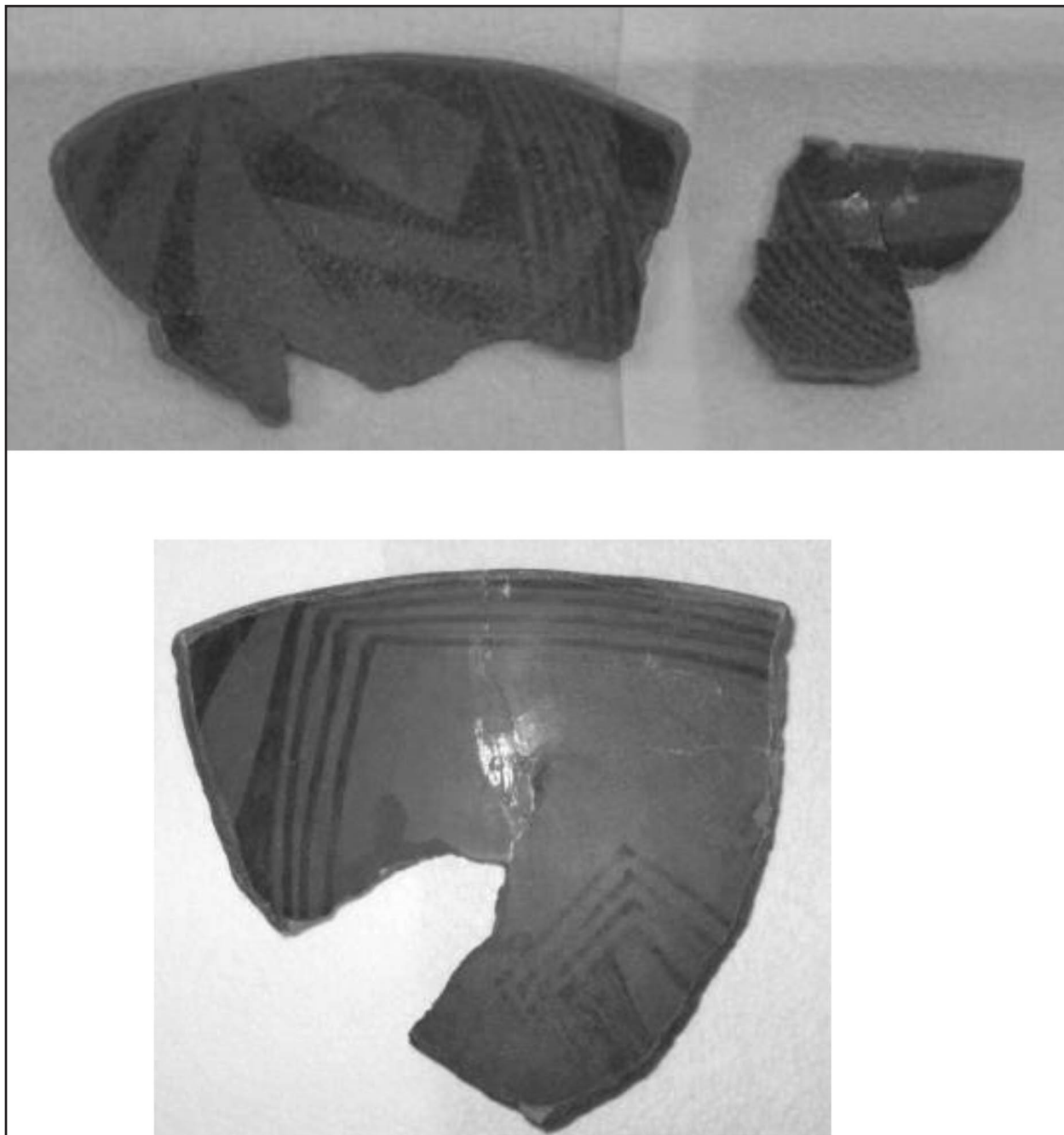


Figure 1. 42Ka3831, F18 burial: (lower) Medicine B/R (Deadmans style?); (upper) indirectly associated Medicine B/R sherds.

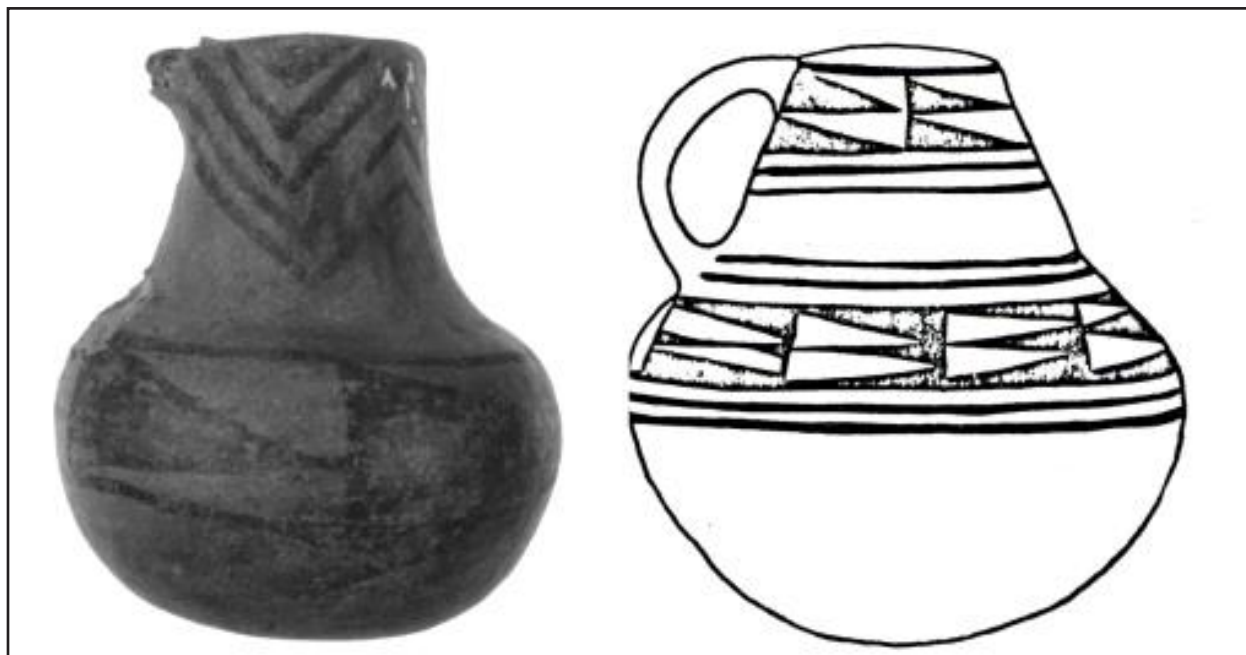


Figure 2. Medicine? B/R vessel from 42 Ka3973 (surface), height 4 3/4 inches (left). “Tusayan” B/R pitcher from Site 2 Mollies Nipple Canyon (42Ka1811), height 5 1/2 inches (Steward 1941:303) (right).

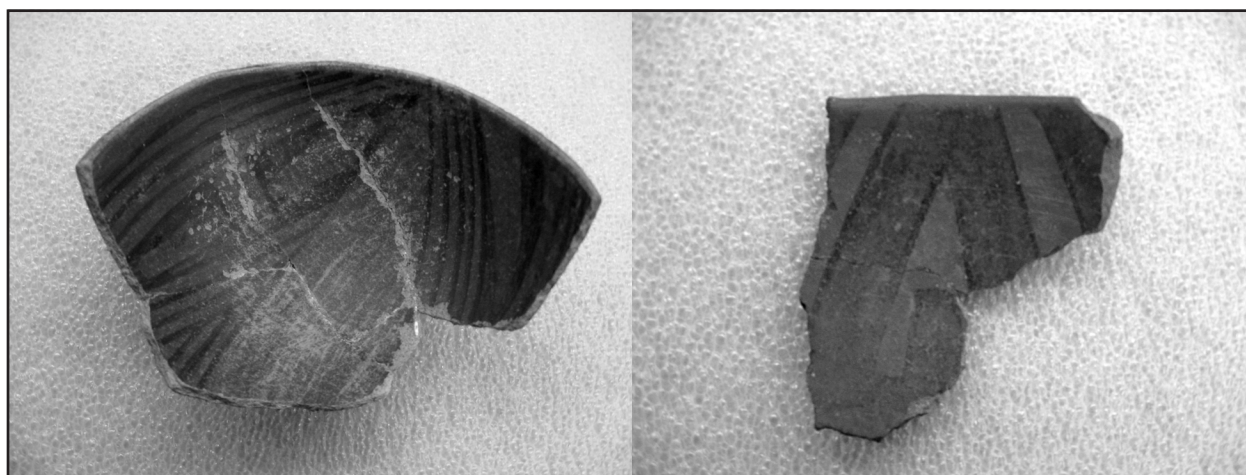


Figure 3. Tsegi Orange Ware sherds from 42Ka1504, Judd’s Cave 6. Medicine Black-on-red (left); Citadel Polychrome (right).

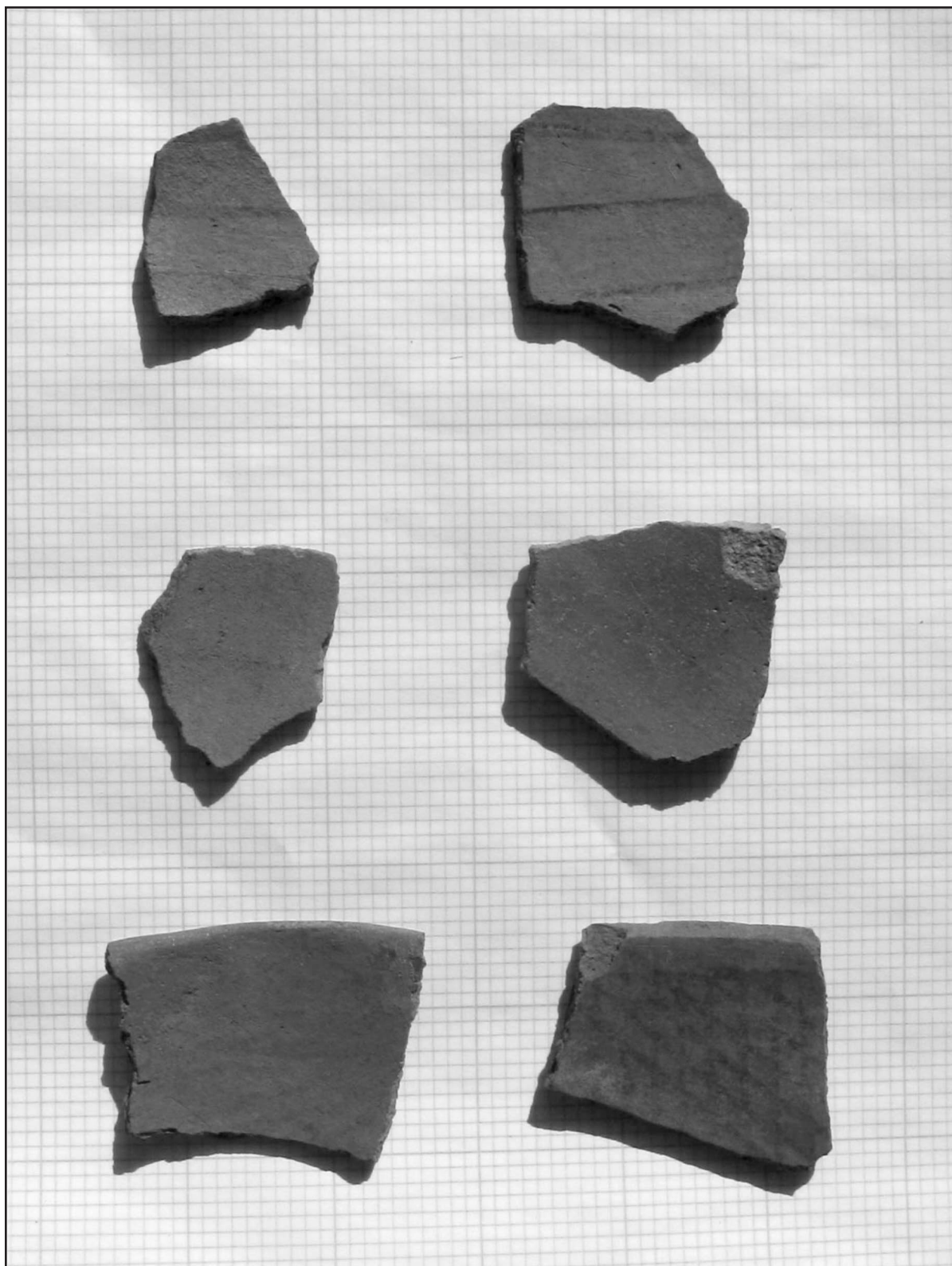


Figure 4. Shinarump Red Ware samples; Upper row Nankoweap Polychrome S-2 and S-5, Shinarump Red Ware S-8, S-10, S-3, unident Shinarump b/r S-9, note beveled rim.



Figure 5. Citadel Polychrome, Tsegi Orange ware, 42 Ka1504 Judd's Cave 6, 42Ka1504, A.D. 1111vv (left); Nankoweap Ploychrome, Shinarump Red Ware, Pottery Knoll 42Ka1567, circa A.D. 1200+ Reference 1 a, Trench 91-1; Cat#7104 (Neff et al. 1997) (right).



Figure 6. Shinarump Red Ware, 42Ka2664.



Figure 7. Shinarump Red Ware bowl, 42Ka3976.

APPENDIX E

Fiftymile Mountain Artifact and Sherd Log

Site #	Temporary #	Emery Gray	Plain Gray	Corrugated	Chevelon Corrugated	Shinarump Corrugated	Shinarump Redware	Shinarump B/W	Shinarump Plain	Shinarump Brown	Tsegi B/R	Tsegi Orangeware	Dogoszhi Variety Shinarump Red	Unidentified B/W	Dogoszhi B/W	Black Mesa B/W	B/W Sand Tempered	Basal Notch White Chert	White Chert Frag	Biface Frag	Bull Creek Base	Bull Creek P.P.	Point Tip	Chert Midsection pp	Rose Spring PP	Desert Side Notch PP	Bone Bead
42Ka4453	LCR-1	33	5																								
42Ka817	LCR-3																									1	
42Ka816	LCR-4	1	21	8			11							4													
	LCR-6	2	7	7		2								4									1				
42Ka827	LCR-7	3	8	19										2													
	LCR-11	45				1									1												
	LCR-13		2	6						1				4													
	LCR-14	17		5								2															
42Ka838	LCR-18	1	1																								
42Ka837	LCR-19	3	5	4										4													
42Ka860	LCR-20		14	11								1									1		1				
42Ka858	LCR-22	13	4	4																							
	LCR-25	1	3	15			2							9	1												
	LCR-27	2	10	7		5	5					1		1													
Reconn #2		4																1									
42Ka4444		1																									
	FMR 97-1	12																						1			
42Ka1625	FMR 7/9-3	2	4			2																					
42Ka4365	FMB-4	10	3																								
42Ka4365	FMMR-1-2	22	11																1	4			3	2			
42Ka5957	FMMR-3	7	9		2	2				2				3		1				3							
42Ka3383				3		2	1						1	2													
42Ka5958	SPR-1		3	11		13				3				6													
42Ka5959	SPR-2		4	49		4	4			5				10	19							1	1			1	
42Ka5960	SPR-3	52												1													
42Ka5961	SPR-4			17		13	1	1						6													
42Ka5925		1		6		1	1		1																		
42Ka1456	Z-2			6		1																2					

APPENDIX F

GEOCHRONOLOGICAL STUDIES

Since Herford's (1986) initial geomorphological studies dealing with alluvial history on the GSENM several other researchers have conducted studies that have direct utility for understanding the culture history of the area. Particularly on the Grand Staircase, where agriculture was often practiced along the major washes, prehistoric settlement patterns may have been affected by cut and fill episodes. It appears that each drainage may have a separate and individual history resulting from both natural and cultural processes. An understanding of the processes that control the aggrading and down-cutting of wash beds has the potential to explain demographic shifts caused by destruction of agricultural fields.

A brief review of studies conducted on or near the GSENM that may have application to archeological studies are listed below.

KITCHEN CORRAL DRAINAGE

Kulp (1995), working under the direction of Dr. Cathrine Rigsby, Department of Geology, East Carolina University, reports 15 AMS dates for 9 alluvial fill units identified in the Kitchen Corral drainage. The dates range from 46,900-39,700 B.C. (OS-5311) to the modern era. Of particular interest here, are dates that correlate with the Early Basketmaker III, Late Basketmaker III and Late PII periods. Kulp's investigations demonstrate the potential for geo-archeological investigations to correlate ancient floodplains with Anasazi occupations - and conversely, to help explicate the apparent lack of occupation during certain periods.

NOS AMS #	Sample #	AMS age BP	Age Error	Unit
OS-5312	K2-1 (R)	MODERN	-	A4
	D3-4 (D)	540	60	A4
OS-5152	D5-4 (R)	595	30	A4
OS-5151	D5-3 (R)	655	30	A4 (reworked)
OS-5153	D5-5	860	45	A3
OS-5142	K1D	905	30	A3
	D3-2 (D)	1330	50	A2
OS-5143	K1A-2	1520	30	A1 (reworked)
	D3-1 (D)	1639	70	A1
OS-5148	D3-3	1650	30	A3 (reworked)
OS-5308	P3A-2	2910	30	P
OS-5147	K1C-2	3280	35	P
OS-5146	K3-2 (R)	5500	60	P (reworked)
OS-5149	D5-1	41400	1600	P (reworked)
OS-5145	K3-1 (R)	42800	1100	OTA
OS-5144	K2-2 (R)	45100	390	A5? (reworked)
OS-5309	P4-2	46600	1700	A4? (reworked)
OSS-5311	D2-9	47000	1900	OTA
(Note; age determinations are from charcoal and were dated at the Woods Hole National Oceanic Sciences AMS facility using the combustion (OC) process.)				

Table 1. Radiocarbon/AMS Assays of the Alluvial sequence in Kitchen Corral Wash
(After Kulp 1995: Table 1).

From the perspective of conducting future work in Kitchen Canyon, Kulp's dated strata are a valuable resource that could benefit investigations in the drainage system - if they can be relocated. If Kulp's dated Anasazi strata can be reidentified near dated archeological sites, they could be a valuable asset to the study of Anasazi land - use patterns. Kulp provides evidence for cultivation based on stable isotopic ratios of paleosol-carbonates; an independent test of his conclusions would be to sample selected strata for maize pollen. If the relevant strata exist near archeological sites dating to the Basketmaker and late Puebloan periods, the presence of maize pollen would address issues of subsistence, prehistoric land-use, and possibly shed light on why sites of the intervening Pueblo I and early Pueblo II periods are not represented.

JOHNSON CANYON, KANAB CREEK (Webb et al. 1991)

Historic Channel Change of Kanab Creek (Webb et al. 1991). No dates were involved in this study but the fine grained, apparently very stable, qualities of the Johnson Canyon alluvium may be directly related to the lengthy, possibly unbroken, sequence of occupation in the canyon. Smith (1990) provides additional data in his master's thesis "Large Floods and Rapid Entrenchment Kanab Creek".

Abstract from: Holocene Paleoecology of Utah's Grand Staircase-Escalante National Monument: Human Impacts on the Landscape and Implications for Land Management on the Colorado Plateau (Robert M. D'Andrea, NAU, 2015)

Two sediment cores (LP-12-03 and MC-13-01) and five *Neotoma* middens were recovered from southern Utah's Grand Staircase-Escalante National Monument and reconstructions of climate, fire and vegetation histories for Fiftymile Mountain and Meadow Canyon were created through the analysis of lithological proxies, stratigraphic pollen and charcoal, and plant macrofossils. The record from LP-12-03 indicates that during the middle Holocene, from ca. 7300-3500 cal yr BP, Fiftymile Mountain was dominated by open *Juniperus* sp. (juniper) woodland with little fire occurrence and during the late Holocene, from ca. 3500-140 cal yr BP, the landscape became more dense with *Juniperus-Pinus edulis* (juniper-pinyon) woodland. Fire occurrence increased initially at ca. 1600 cal yr BP with Formative settlement and then increased dramatically at ca. 650 cal yr BP with Formative abandonment and reductions in arboreal taxa and increases in disturbance related taxa during this time period suggest that Fiftymile Mountain had been actively managed for agriculture. Since Euro-American settlement, from ca. 140 to -62 cal. yr BP, the area has been dominated by *Pinus edulis-Juniperus* (pinyon-juniper) woodland with decreased fire occurrence and higher rates of erosion unprecedented in the record. The record from MC-13-01 indicates that throughout the late Holocene, from ca. 1650- -63 cal yr BP, Meadow Canyon has been dominated by *Juniperus-Pinus edulis* (juniper-pinyon) woodland, with a major shift in fire regime occurring at ca. 1600 cal yr BP with Formative settlement. Previous to this time, from ca. 2500-1600 cal yr BP, there had been a large fire event approximately every ca. 200-300 years, and since then, local fire occurrence has decreased dramatically, likely due to human suppression and management. The *Neotoma* midden record documents the presence of agriculture in the area, with the Virgin Anasazi cultivating *Zea mays* (corn) during Basketmaker III times (ca. 1250 cal yr BP) and *Phaseolus* (bean) and *Zea mays* during Pueblo II times (ca. 850 cal BP) on the Wygarrette Terrace, and *Phaseolus* within Meadow Canyon during Pueblo II times (ca. 820 cal BP). These records are important for the BLM as they document the effects that livestock grazing has had on the environment within two cattle allotments, provide a baseline of natural fire and vegetation spanning back to the middle Holocene for areas within the Grand Staircase and Kaiparowits Plateau, and indicate that archaeological sites within Meadow Canyon and on Fiftymile Mountain are of significant scientific and historic value as they provide information about early agriculture on the Colorado Plateau.

(Note)

Briefly described in the text, *Phaseolus* sp. pollen was recovered from a Late Prehistoric packrat midden in Meadow Canyon (MC-2A, approximately BP 271-497), potentially indicating bean farming by the Southern Paiutes. As discussed in the text, there appears to be a fire history that is influenced by farming in Meadow Canyon that continued in post-Anasazi times, while on Fiftymile Mountain the anthropogenic regime seems to stop after Formative abandonment: both locations have a very good, anthropogenic fire history from about A.D. 400-1200 but very different natural fire histories prior to farming.

SHORT CREEK/CORRAL CANYON (Naylor 1996)

In Mohave County Arizona, Naylor (1996) has provided radiocarbon dates from buried Anasazi sites and associated strata along Short Creek near Colorado City. Although not in the Monument itself, these dates are relevant to this study because they occur on the Grand Staircase physiographic section of the Colorado Plateau (Table 2).

Feature/Terrace Deposit	Laboratory Number	Radiocarbon Age	Cal. Intercept	1 Sigma Cal. (68% prob.)	2 Sigma Cal. (95% prob.)
PH2	Beta 96907	1730+/-70 BP	A.D. 340	A.D. 240-410	A.D. 135-450
PH4	Beta 92485	1950+/-100 BP	A.D. 70	40 B.C.- A.D. 160	180 B.C.-A.D. 265 and A.D. 290-320
PH5	Beta 92484	1730+/-60 BP	A.D. 340	A.D. 245-405	A.D. 160-435
Deep charcoal lens	Beta 74928	2010+/-50 BP	0 B.C.	50 B.C.-A.D. 60	110 B.C.-A.D. 100
Sand Blanket	Beta 74931	760+/-60 BP	A.D. 1270	A.D. 1240-1290	A.D. 1180-1310 and A.D. 1360-1380
Terrace North of Short Creek- younger deposit	Beta 74930	3270+/-70 BP	1520 B.C.	1620-1440 B.C.	1690-1410 B.C.
Terrace North of Short Creek- older deposit	Insufficient carbon				

Table 2. Radiocarbon Dates from Short Creek Mohave Co. Arizona (From Naylor 1996, Table2).

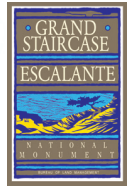
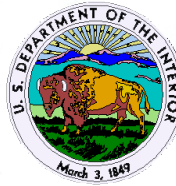
PARIA DRAINAGE (Herford 1986)

Herford describes stream channel changes in the Paria River basin for the modern period. The Paria River is one of the major water courses on the monument, but use of the extensive alluvium along its banks for agriculture seems to have been very limited. A consideration of the processes at work may be relevant to prehistoric studies as well.

UPPER VALLEY/ESCALANTE DRAINAGE (Webb and Hasbargen 1997)

Webb and Hasbargen (1997) describe Upper Valley Creek, one of the tributaries which form the headwaters of the Escalante River, as having developed arroyos about 2 ka, 1.5 ka, 1 ka and .5 ka before present. The authors report "On the distal margin of the floodplain at the confluence of Upper Valley and Birch Creeks, stratigraphy, snail species, and alluvial pollen indicate fluctuations in ground-water levels." Of interest to local prehistory is the finding that prior to about A.D. 900 "sediments indicate consistently high ground water...."

Fremont residential sites and granaries dating circa A.D. 900-1000 are common in the area. These agriculturally based sites presumably relied on the perennial waters of the upper Escalante; there appears to be potential to correlate Fremont settlement patterns with the reconstruction of floodplain environments in the drainage.



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