

Archaic Foragers and Ancestral Puebloans of Canyonlands National Park

Alan R. Schroedl and Nancy J. Coulam



With Contributions by William A. Lucius and Betsy L. Tipps



P-III Associates, Inc.

Archaic Foragers and Ancestral Puebloans of Canyonlands National Park

Archaic Foragers and Ancestral Puebloans of Canyonlands National Park

Alan R. Schroedl and Nancy J. Coulam

with contributions by William A. Lucius and Betsy L. Tipps



Canyonlands Archeological Project Report No. 5

P-III Associates, Inc., St George, Utah

November 2021



Attribution-NonCommercial

CC BY-NC

PREFACE

Between 1985 and 1990, P-III Associates Inc. (P-III Associates) conducted six seasons of archeological field investigations in Canyonlands National Park, situated in the rugged canyon country of southeastern Utah. All of the fieldwork and the four previous inventory reports noted in Table 2 were prepared under a contract with the National Park Service (NPS). Because the NPS did not fund the completion of the inventory reports from two seasons of fieldwork in the Upper Salt Creek Area nor a project summary report, this final report was prepared entirely by volunteer efforts by all the authors.

This document is the fifth and final report in P-III Associates' investigations in Canyonlands National Park. This report was prepared with the assistance of Betsy L. Tipps and William A. Lucius. Betsy Tipps, the Project Director for all field seasons, proofread and commented on earlier drafts of this report. In an appendix, William A. Lucius provided updated interpretations for the pottery analysis he completed decades ago.

The report is divided into three major parts: the first describes the results of two seasons of archeological inventory in the Upper Salt Creek Area.

The second part summarizes the results of the Canyonlands Archeological Project and provides an assessment of our current understanding of the prehistory of Canyonlands National Park. The third part includes technical appendices relevant to the project.

Most of the Canyonlands Archeological Project effort was concentrated in the Needles District, where cliff dwellings and many rock art sites are located. In fact, it is these Puebloan ruins and rock art panels that contributed to the designation of this area as a national park in 1964. Since then, public interest in the archeology of the park has continued to grow. This report summarizes the prehistory of Canyonlands National Park for the interested public and as well as the professional archeologist. Finally, this report also dispels some of the long-standing confusion about the cultural affiliation of the Ancestral Puebloans who occupied this region prehistorically.

Alan Schroedl, Principal Investigator
November 2021

Cover: Portion of Big Ruin in Upper Salt Creek Area.

CONTENTS

PREFACE	iv
ILLUSTRATIONS	viii
TABLES	xi

PART 1:

CANYONLANDS ARCHEOLOGICAL PROJECT, 1985-1990

INTRODUCTION	2
CANYONLANDS ARCHEOLOGICAL PROJECT BACKGROUND	5
Field Methods of the Canyonlands Archeological Project	7
Limitation of Inventory Data	9
Chronological Framework for Canyonlands National Park.....	10
SUMMARY OF THE UPPER SALT CREEK AREA INVENTORY, NEEDLES DISTRICT.....	13
Setting and Natural Resources	14
Upper Salt Creek Inventory Results	15
Unknown Prehistoric Sites.....	16
Archaic Period Sites.....	17
Formative Period Sites.....	17
Limited Activity Sites	19
Fieldhouse Sites	21
Great Kiva.....	21
Habitation Sites.....	21
Rock Art in the Upper Salt Creek Area.....	26
Formative Food Processing and Storage in the Inventory Area	28
Anasazi Population Estimates for the Upper Salt Creek Area	29
SUMMARY OF THE INVENTORY RESULTS OF THE UPPER SALT CREEK AREA.....	30
CANYONLANDS ARCHEOLOGICAL PROJECT RESULTS.....	32
Radiocarbon Determinations of the Canyonlands Archeological Project.....	32
Plant Macrofossils.....	35
Toolstone Use in the Needles District.....	36
Chronological Periods in the Inventoried Areas	36
Paleoindian Period	36
Archaic Period	37
Early Archaic Period.....	38
Middle Archaic Period.....	39

Late Archaic Period.....	39
Formative Period.....	40
Protohistoric Period	40

PART 2:

SYNOPSIS OF THE ARCHEOLOGY OF CANYONLANDS

NATIONAL PARK

INTRODUCTION	42
PALEOINDIAN AND ARCHAIC PERIODS	43
FORMATIVE OCCUPATION IN THE PARK	45
Formative Chronology and Population.....	45
Formative Climate and Farmers.....	46
Formative Period Pottery	48
Formative Period: Canyon Settlements and Architectural Types	50
Formative Period: The Fremont-Anasazi Frontier	53
PROTOHISTORIC PERIOD.....	57
FINAL SUMMARY	58
NOTES.....	59
REFERENCES	61
APPENDICES	72
A. Historical Background of Needles District Archeology (by Alan R. Schroedl)	72
B. Understanding Prehistoric Pottery in the Needles District of Canyonlands National Park, Utah: Wider Contexts and Perspectives (by William A. Lucius)	82
C. Review of Marvin Kay’s 1973 Surface Collections in Wayne and Garfield Counties, Utah (by Betsy L. Tipps)	91
D. Radiocarbon Dates from the Needles District and Bayesian Chronological Modeling of Selected Time Periods (by Nancy J. Coulam).....	110
E. Selected Chipped Stone Artifacts from the Upper Salt Creek Area	126
F. Selected Rock Art Images of Upper Salt Creek Area	131
G. Plan Maps of Selected Sites in the Upper Salt Creek Area.....	141
H. The Peekaboo Basket (42SA20209)	148
I. Stone Circles in the Needles District, Canyonlands National Park.....	151

J. Tree-ring Dating in Needles District, Canyonlands National Park	159
K. The Faces Motif Rock Art in Canyonlands National Park as Possible	
Ancestor Images (by Nancy J. Coulam)	166
L. Selected Color Photographs from the Canyonlands Archeological Project	186

ILLUSTRATIONS

Figure 1. Map of Canyonlands National Park depicting major perennial water courses	3
Figure 2. Map of the general inventory areas within Canyonlands National Park	8
Figure 3. Terrain and topography of Upper Salt Creek Area	9
Figure 4. Inaccessible structure at limited activity site 42SA21124.....	10
Figure 5. General terrain of Upper Salt Creek Area	13
Figure 6. Upstream view of Salt Creek depicting the historic downcutting of the alluvial terraces.....	14
Figure 7. Cedar Mesa sandstone outcrops in Upper Salt Creek Area.....	15
Figure 8. General view of Upper Salt Creek Area	16
Figure 9. Cross-section of Feature 8 from limited activity site 42SA21095	17
Figure 10. Alcove habitation site with small kiva, site 42SA21108	19
Figure 11. Masonry structure at alcove habitation site 42SA17786.....	20
Figure 12. Alcove habitation site 42SA17119	22
Figure 13. Plan map of Big Ruin (42SA1586)	23
Figure 14. Masonry structures at Big Ruin (42SA1586).....	24
Figure 15. 1989 aerial view of Big Ruin (42SA1586).....	25
Figure 16. Alcove habitation site with small kiva, site 42SA21120.....	26
Figure 17. Petroglyph at alcove habitation site 42SA21108.....	27
Figure 18. Example of negative Anasazi hand print, site 42SA21112.....	28
Figure 19. Zoomorph pictograph and handprints at limited activity site 42SA21085.....	29
Figure 20. Sawtooth pictograph panel at fieldhouse site 42SA17800	31
Figure 21. Masonry rooms with t-shaped doorway at alcove habitation site 42SA21108	31
Figure 22. Map of suitable areas for prehistoric farming in Canyonlands National Park	47
Figure 23. Cultural traditions around Canyonlands National Park region.....	49
Figure 24. Granary on large boulder at field house site 42SA1596.....	52
Figure 25. Granary on ledge at limited activity site 42SA21123.....	53
Figure 26. “Holy Ghost” pictograph (42WN418).....	54
Figure 27. All American Man (42SA1614).....	55
Figure 28. Canyonlands Anasazi Faces Motif rock art style; Four Faces (42SA1629).....	56
B-1. Mesa Verde Pueblo III pottery bowls from the Needles District	84
B-2. Pie chart of percentage contribution to total sherd counts by time periods	88
D-1. Macaw feather apron recovered from Lavender Canyon, Needles District.	120
D-2. Date range of Formative occupation in the Needles District.....	122
E-1. Selected projectile points	126

E-2. Selected Formative period arrow points	127
E-3. Selected projectile points	128
E-4. Selected side scrapers.....	128
E-5. Selected end scrapers	128
E-6. Selected bifaces.....	129
E-7. Chopper.....	130
E-8. Axe	130
E-9. Graver.....	130
F-1. Rock art, site 42SA1585.....	131
F-2. Rock art, site 42SA1585.....	132
F-3. Rock art, site 42SA17800.....	133
F-4. Rock art, site 42SA1598.....	134
F-5. Rock art, site 42SA21110	135
F-6. Rock art, site 42SA17803.....	136
F-7. Rock art, site 42SA1584.....	137
F-8. Rock art, site 42SA21109.....	138
G-1. Plan map site 42SA1581.....	139
G-2. Plan map site 42SA17119.....	140
G-3. Plan map, site 42SA17107.....	141
G-4. Plan map, site 42SA17783.....	142
G-5. Plan map, site 42SA17786.....	143
G-6. Plan map, site 42SA17800.....	144
G-7. Plan map, site 42SA21108.....	145
G-8. Plan map, site 42SA21111	146
G-9. Plan map, site 42SA21120.....	147
H-1. Peekaboo basket (42SA20209).....	148
H-2. Field notes Peekaboo basket (42SA20209).....	149
H-3. Field notes Peekaboo basket (42SA20209).....	150
H-4. Peekaboo basket (42SA20209).....	150
I-1. Letter from Linda Honeycutt to P-III Associates	152
I-2. Letter from Linda Honeycutt to P-III Associates	153
I-3. Letter from Linda Honeycutt to P-III Associates	154
I-4. Letter from Linda Honeycutt to P-III Associates	155
I-5. Letter from Gary Brown to Linda Honeycutt.....	156
I-6. Site 42SA1594 being recorded in 1986.....	157
I-7. Stone circles atop an inaccessible mushroom-shaped outcrop at site 42SA1594.....	157
I-8. Stone circle at site 42SA17764	158

I-9. Stone circle at site 42SA17769	158
J-1. Laboratory of Tree-Ring Research correspondence.....	160
J-2. Laboratory of Tree-Ring Research correspondence.....	161
J-3. Laboratory of Tree-Ring Research correspondence.....	162
J-4. Laboratory of Tree-Ring Research correspondence.....	163
J-5. Laboratory of Tree-Ring Research correspondence.....	164
J-6. Laboratory of Tree-Ring Research correspondence.....	165
K-1. Current distribution of the Faces Motif in Canyonlands National Park	166
K-2. Five Faces (42SA7736)	169
K-3. Three of the Eleven Faces (42SA22690).....	169
K-4. Sky Faces (42SA25552)	171
K-5. Four Faces (42SA1629).....	172
K-6. Striped Faces (42SA1592).....	173
K-7. Thirteen Faces (42SA1652).....	174
K-8. Kilt Man (42SA15540).....	175
L-1. View of Devils Lane, Grabens Area.....	187
L-2. Inventory crew in Salt Pocket area, Lower Salt Creek Area.....	188
L-3. Inventory crew in the White Crack Area.....	188
L-4. Inventory crew in Upper Salt Creek Area	189
L-5. Barrier Canyon Style anthropomorph, Lower Salt Creek Area, site 42SA17092.....	189
L-6. Rock art, Grabens Area, site 42SA17106.....	190
L-7. Barrier Canyon Style rock art, Grabens Area, site 42SA1996.....	190
L-8. Barrier Canyon Style rock art, Grabens Area, site 42SA1682.....	191
L-9. Canyonlands Anasazi style rock art, Grabens Area, site 42SA1450.....	191
L-10. Canyonlands Anasazi style rock art, Grabens Area, site 42SA1450.....	192
L-11. Rock art, Grabens Area, site 42SA17187.....	192
L-12. Pictograph of the eponymous bird, White Bird Shelter (42SA20615), Lower Salt Creek Area.....	193
L-13. Anasazi hand prints, Lower Salt Creek Area, White Bird Shelter (42SA20615)	193
L-14. Close up of a negative Anasazi hand print, Lower Salt Creek Area, White Bird Shelter (42SA20615).....	194
L-15. Barrier Canyon Style anthropomorph with a superimposed Anasazi hand print, Lower Salt Creek Area, White Bird Shelter (42SA20615).....	194
L-16. Barrier Canyon Style rock art with superimposed Anasazi hand prints, Lower Salt Creek Area, White Bird Shelter (42SA20615).....	195
L-17. Barrier Canyon style rock art panel, Lower Salt Creek Area, White Bird Shelter (42SA20615)....	195
L-18. Rock art, Lower Salt Creek Area, site 42SA20268.....	196
L-19. Habitation site, Upper Salt Creek Area, site 42SA1581	196

L-20. Masonry structure, Upper Salt Creek Area, site 42SA1581.....197

L-21. Field crew recording structures, Upper Salt Creek Area, site 42SA1581197

L-22. Granary under overhang, Upper Salt Creek Area, sites 42SA17810198

L-23. Grinding slicks and sharpening grooves, Upper Salt Creek Area, site 42SA17823198

L-24. Masonry structure, Upper Salt Creek Area, site 42SA21108.....199

L-25. Grinding slicks, Upper Salt Creek Area, site 42SA21120199

L-26. Habitation site, Upper Salt Creek Area, site 42SA21120200

L-27. Grinding slicks and unused rough outs, Upper Salt Creek Area, site 42SA21125200

L-28. T-shaped doorway, with shaped masonry slabs, Upper Salt Creek Area, site 42SA21108.....201

TABLES

Table 1. Project Participants in the Canyonlands Archeological Project.....	4
Table 2. Project Details for 1985–1990 Canyonlands Archeological Project.....	6
Table 3. Final Chronology of the Canyonlands Archeological Project	11
Table 4. Frequency of Components by Time Period and Site Type in the Upper Salt Creek Area	16
Table 5. Total Count of Pottery Sherds on Sites in the Upper Salt Creek Area.....	17
Table 6. Characteristics of the Archaic Components in Upper Salt Creek Area.....	18
Table 7. List of Radiocarbon Dates from the Canyonlands Archeological Project	33
Table 8. Obsidian Sourcing and Hydration Results from the Canyonlands Archeological Project.....	36
Table 9. Count of Sites and Components from the Canyonlands Archeological Project	37
Table A-1. Chronology of Important Archeological Investigations in the Needles District through 1990	74
Table B-1. Count of Pottery Sherds by Ware and Types Identified from the Needles District, Canyonlands National Park.....	83
Table B-2. Pottery Types of Major Time Periods by Percent of Sherds and Percent of All Periods.....	84
Table B-3. Non-ceramic Artifacts from Sharrock's Survey Curated by Natural History Museum of Utah	87
Table D-1. Rejected Radiocarbon Determinations	112
Table D-2. Time Span of Protohistoric Period in the Needles District and the Modeled and Unmodeled Radiocarbon Dates.....	113
Table D-3. Time Span of Corn Dates in the Needles District and the Modeled and Unmodeled Radiocarbon Dates.....	114
Table D-4. Time Span of Pueblo III Period in the Needles District and the Modeled and Unmodeled Radiocarbon Dates.....	116
Table D-5. Archaic to Pueblo I Unmodeled Radiocarbon Dates from the Needles District.....	119
Table D-6. Selected Radiocarbon Dates from the Maze and Island in the Sky Districts	121
Table J-1. Attributes of Faces Motif Anthropomorphs from Thirteen Sites	168

PART 1
THE CANYONLANDS ARCHEOLOGICAL
PROJECT, 1985–1990

INTRODUCTION

Between 1985 and 1990, crews from P-III Associates conducted six seasons of archeological inventory within the Needles and Island in the Sky districts of Canyonlands National Park on behalf of the National Park Service (NPS) as the Canyonlands Archeological Project. Canyonlands National Park is located in the rugged canyon country of southeastern Utah, encompassing the confluences of two major rivers in western North America, the Green and the Colorado. The rivers divide the park into three administrative districts: The Maze District, west of the Green and Colorado rivers and including the Horseshoe Canyon Detached Unit (also known as Barrier Canyon); the Island in the Sky District, north of the confluence between the two rivers; and the Needles District, east and south of the confluence (Figure 1).

The project was part of a larger multidisciplinary program that included studies by other independent contractors: rock art documentation by Native American Rock Art Research Associates (Noxon and Marcus 1982, 1985), historic sites research by Western Historical Studies, Inc. (Mehls and Mehls 1986), and ruins stabilization by Nickens and Associates (Firor 1988; Metzger and Chandler 1986), and paleoenvironmental investigations by the Quaternary Studies Program, Northern Arizona University (Agenbroad 1986; Agenbroad and Meade 1992).

Adrienne Anderson, a Regional Archeologist for the NPS, managed this multidisciplinary project. It was her intent that the results of this multidisciplinary program would be used to enhance public appreciation of Canyonlands Na-

tional Park through multi-authored, popular syntheses of information from the various cultural and environmental studies (National Park Service 1984). But before all these studies were completed, the NPS shifted priorities so some of the final reports and popular syntheses were never funded.

The Canyonlands Archeological Project was logistically difficult. In spite of the obstacles, the crews were able to inventory more than 8000 acres in the park and they identified or rerecorded more than 450 archeological sites. A large number of people participated in the project and contributed to the completion of this report. Table 1 provides a list of the personnel at P-III Associates who participated in project, as well as subcontractors, volunteers, and consultants, although a few individuals who volunteered for a few days are not listed.

This document provides the final report on the Canyonlands Archeological Project (1985–1990). It summarizes the 1986 and 1989 archeological inventories in the upper Salt Creek and Big Pocket areas of the Needles District and provides additional topical information from the project (Appendices A-K). It also corrects some errors in the administrative history of Canyonlands National Park (Schmieding 2008) regarding archeological work in the park and provides bibliographic citations to archeological reports relating to Canyonlands National Park not discussed by Schmieding.

More importantly, as presented in part two, the Canyonlands Archeological Project provided the foundation for a current synopsis of the prehistory of Canyonlands National Park. This synopsis clarifies the periods of prehistoric occupations and cul-

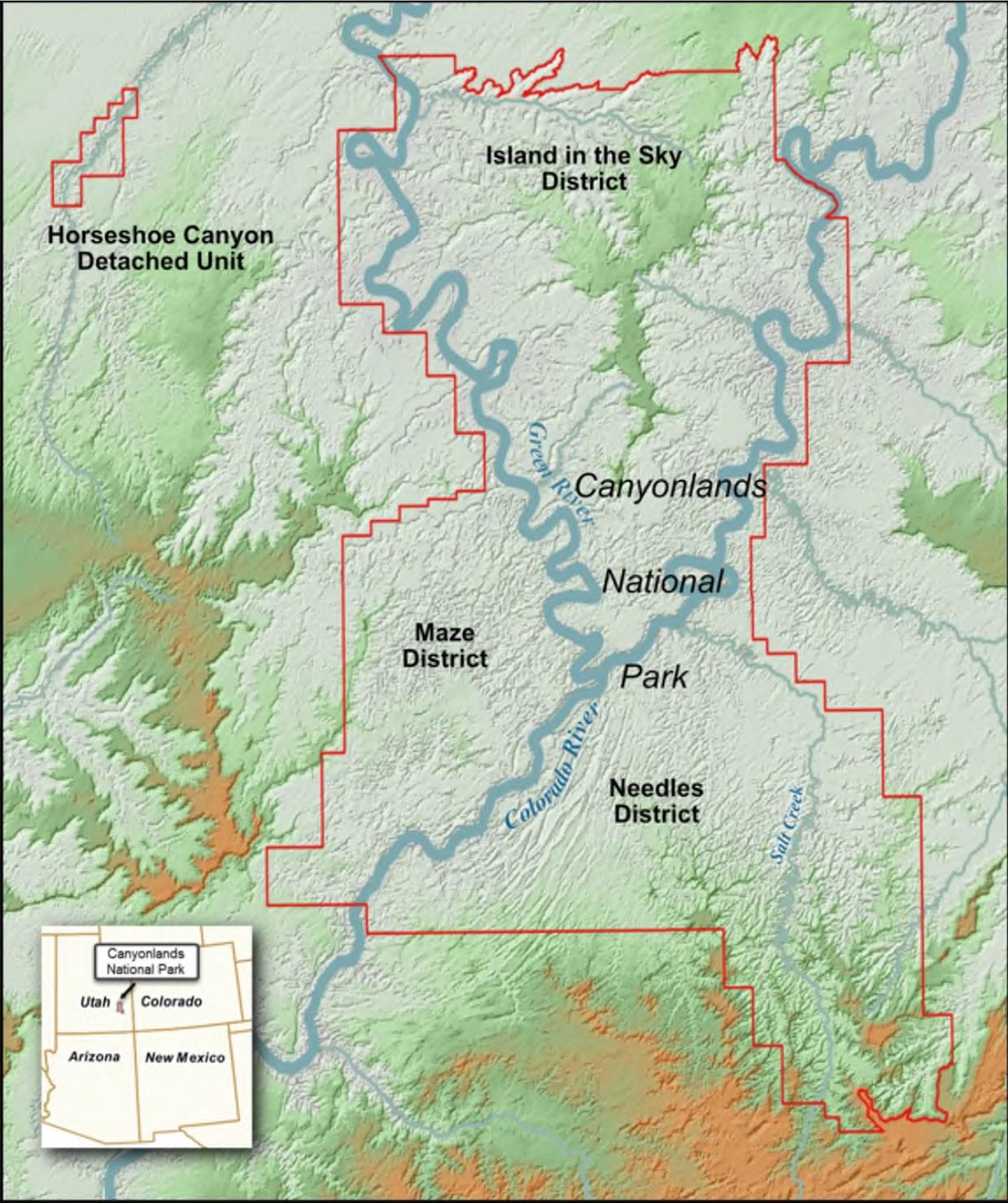


Figure 1. Map of Canyonlands National Park depicting major perennial water courses. Elevations below 7000 ft (2130 m) are depicted in green.

Table 1. Project Participants in the Canyonlands Archeological Project.

K. Renee Barlow	Larry L. Hause	Janet L. McVickar
Douglas W. Bird	Kathy M. Heath	Elizabeth K. Miksa
Robert I. Birnie	Nancy J. Hewitt	Greg H. Miller
Joel M. Brisbin	Richard E. Hughes	Daniel K. Newsome
Gary M. Brown	Winston Hurst	Mark S. Newton
Maureen Cavanaugh	Cari M. Inoway	Thomas M. Origer
Denise E. Copeland	Lisa M. Jarrow	Gary M. Popek
James W. Copeland	Susan C. Kenzle	T. Todd Prince
Nancy J. Coulam	David A. Kice	Michelle A. Sanders
Sheryl D. Dowden	Whitney S. Kim	Amy E. Strand
Sonja K. Duke	Andre D. La Fond	M. Kate Stratford
John A. Evaskovitch	Kenneth L. Lawrence	Katherine C. Stroh
Rachel B. Fisher	William A. Lucius	Dean E. Tallman
Debbie A. Fluckiger	Jeremy J. Main	Betsy L. Tipps
June D. Freedman	Julie A. Mann	Andrea J. Tucker
Jeffrey W. Haney	Steven J. Manning	Robert Wagner
Barclay W. Hasting	David A. McCullough	Scott M. Whitesides

tural affiliation of the prehistoric peoples who occupied the park within the context of what is known today regarding the regional prehistory.

CANYONLANDS ARCHEOLOGICAL PROJECT BACKGROUND

The Canyonlands Archeological Project was a multiyear archeological project in Canyonlands National Park, funded by a contract between the NPS's Rocky Mountain Region and P-III Associates, Inc.¹ In 1985, P-III Associates submitted a proposal in response to a Request for Proposals by the NPS for a multi-year archeological project in Canyonlands National Park. As the successful bidder, P-III Associates was awarded contract CX-1200-4-A-063 for the first year, with later years subject to the NPS's scope of work and funding availability. Schmieding (2008:273, end note 108) misrepresents the nature of this contract: it was not a joint effort between P-III Associates and the NPS. All services and deliverables were provided by P-III Associates. Under federal contracting regulations, the NPS could not provide substantial assistance for the project.²

The field portion of the project consisted of intensive cultural resource inventory, testing of the Downwash site in the Maze (42WN1666), and limited feature sampling. The Canyonlands Archeological Project, as envisioned by Adrienne Anderson, was to not only inventory selected areas within the park, but to provide a synthesis of the archeology of the park. Although Byron Cummings reportedly collected a basket and pottery from upper Salt Creek as early as 1894 or 1895, the only summary of park archeology was Sharrock's (1966) report. Appendix A enumerates some of these earlier archeological investigations, focusing on the documented sites.

Beside the inventories and testing at select areas and sites in the park, the project also included

William A. Lucius' analysis of collections (Appendix B) including pottery sherds returned to the Needles Visitor Center by park visitors, pottery collected by Nickens and Associates during stabilization activities, and artifacts curated by the Natural History Museum of Utah that were collected during Sharrock's 1965–1966 inventory of Canyonlands National Park.³

La Fond's analysis of a collection of chipped stone artifacts (1996) from 42SA17597 from the Island in the Sky District and artifacts collected during inventories conducted by Marvin Kay in 1973 in the Maze District (Appendix C) were also contract tasks. The final contract task was a rock art dating project.

The six seasons of fieldwork for the Canyonlands Archeological Project (Table 2) were conducted between 1985 through 1990 and included intensive inventory and feature radiocarbon dating in the Needles District and the Island in the Sky District and reporting on radiocarbon dates from several rock art sites. Reports on four of the six seasons of fieldwork were previously published as noted in Table 2, as unnumbered series. A report on the 1986 season investigations in Big Pocket was deferred with the understanding it would be combined with the results of the 1989 season of inventory of the upper Salt Creek area, adjacent to Big Pocket.

Contract funding was only provided to complete the report on the 1990 season of fieldwork in the Island in the Sky District (Tipps et al. 1996) and to submit the field records and site forms from all years of inventory to Canyonlands National

Table 2. Project Details for 1985–1990 Canyonlands Archeological Project.

Fieldwork Year	Inventory Area	Inventoried Acres	Newly Recorded Sites	Previously Recorded Sites (updated)	Total Sites	Sites Sampled for Radiocarbon Dating	Isolated Finds	General Project Areas	Reference
1985	Salt Creek Pocket area, Needles District	3803	99	2	101	1	66	Lower Salt Creek Area	Tipps and Hewitt 1989
1985	Devils Lane area, Needles District	455	37	4	41	1	10	Grabens	Tipps and Hewitt 1989
1986	Big Pocket area, Needles District	1082	74	11	85	4	38	Upper Salt Creek Area	This report
1987	Butler Flat area, Needles District	1080	50	0	50	0	32	Grabens	Tipps 1996
1988	Squaw Butte area, Needles District	878	75	5	80	6	39	Lower Salt Creek Area	Tipps 1995
1989	Upper Salt Creek area, Needles District ^a	654	49	8	57	3	32	Upper Salt Creek Area	This report
1990	White Crack area, Island in the Sky District	726	37	0	37	5	44	White Crack Area	Tipps et al. 1996
Total		8678	421	30	451	20	261		

^a Site information from Big Ruin (42SA1586) is included in this analysis (Metzger and Chandler 1986).

Park. The NPS did not fund a report on the two seasons of field work in upper Salt Creek and Big Pocket nor a synthesis of the Needles District archeology. This report provides a summary of the results of the 1986 and 1989 inventories and a general overview of the Canyonlands Archeological Project. It also includes a discussion of the archeology in the park within the context of regional prehistory.

The field portion of the Canyonlands Archeological Project was conducted over six seasons in several different areas in the Needles District and the Island in the Sky District. Although different areas were inventoried over the six field seasons, the areas can be grouped into four separate areas of the park. The only work conducted in the Island in the Sky District was the 1990 investigations in the White Crack Area.

All the other areas that were investigated as part of the Canyonlands Archeological were in the Needles District. The 1987 inventory of Butler Flat adjoins the 1985 inventory of Devils Lane and is referred to here as the Grabens Area. The 1988 inventory in Squaw Butte is near the 1985 inventory area in Salt Pocket and this area is referred to as the Lower Salt Creek Area. The 1989 inventory of the upper Salt Creek area abuts the 1986 inventory of Big Pocket and is referred to as the Upper Salt Creek Area as discussed in this report (Figure 2).

Field Methods of the Canyonlands Archeological Project

The field methods employed during the Canyonlands Archeological Project are described in the first-year report (Tipps and Hewitt 1989). The same methods were implemented during all six field seasons. In the late 1980s, the field kit consisted of a handheld compass, 35mm black and white film camera, blank site forms, graph paper for mapping sites, and whatever topographic maps were available. During the project, the crew was often limited to a 15-minute topographic map where the scale was one mile equals one inch. The highly dissected terrain and 80 ft contour intervals

made site locations difficult to plot on the maps, long before global positioning system (GPS) became available. Southern Utah was one of the last areas in the country where 7.5-minute maps became available.

Today, field crews have GPS devices, digital color cameras, computer tablets for data entry, and high resolution orthophoto imagery to aid in the site recording process. The site recording goals in the 1980s were same as they are today, to attempt to find all of the sites in an area and do the best possible job of recording the sites. Then, as today, the Canyonlands Archeological Project crews walked a systematic pattern to find and record all of the sites, an intensive pedestrian inventory.

Intensive inventory of the project areas was slow due to high site density and the dissected nature of the inventory areas which included alcoves, sheltered overhangs, cliff faces, multileveled terraces of eroded outcrops, all of which took time to inspect (Figure 3). Some sites were even inaccessible (Figure 4). Even as careful as the crews were to inspect the inventory areas, they undoubtedly missed some ephemeral sites or features due to various reasons beyond their control, but not nearly as many as Sharrock (1966) and his crew did in 1965.

Inventory procedures in the 1950s and 1960s were different than today. Sharrock, in the acknowledgments to his 1966 report, states he and his assistants completed an intensive survey of the Needles District (Sharrock 1966:i). Sharrock recorded 240 sites of which 222 sites were in the Needles District. The area that Sharrock surveyed is unreported but the sites he recorded in the Needles District were in the Grabens, the Salt Creek area, and Horse Canyon. A comparison between his recorded sites and those of the Canyonlands Archeological Project indicates that his open chipping stations and open transient camps are heavily underreported compared to his other site types. The 1980s inventories in the Upper Salt Creek Area demonstrated that Sharrock and his assistants missed many open sites, indicating that Sharrock

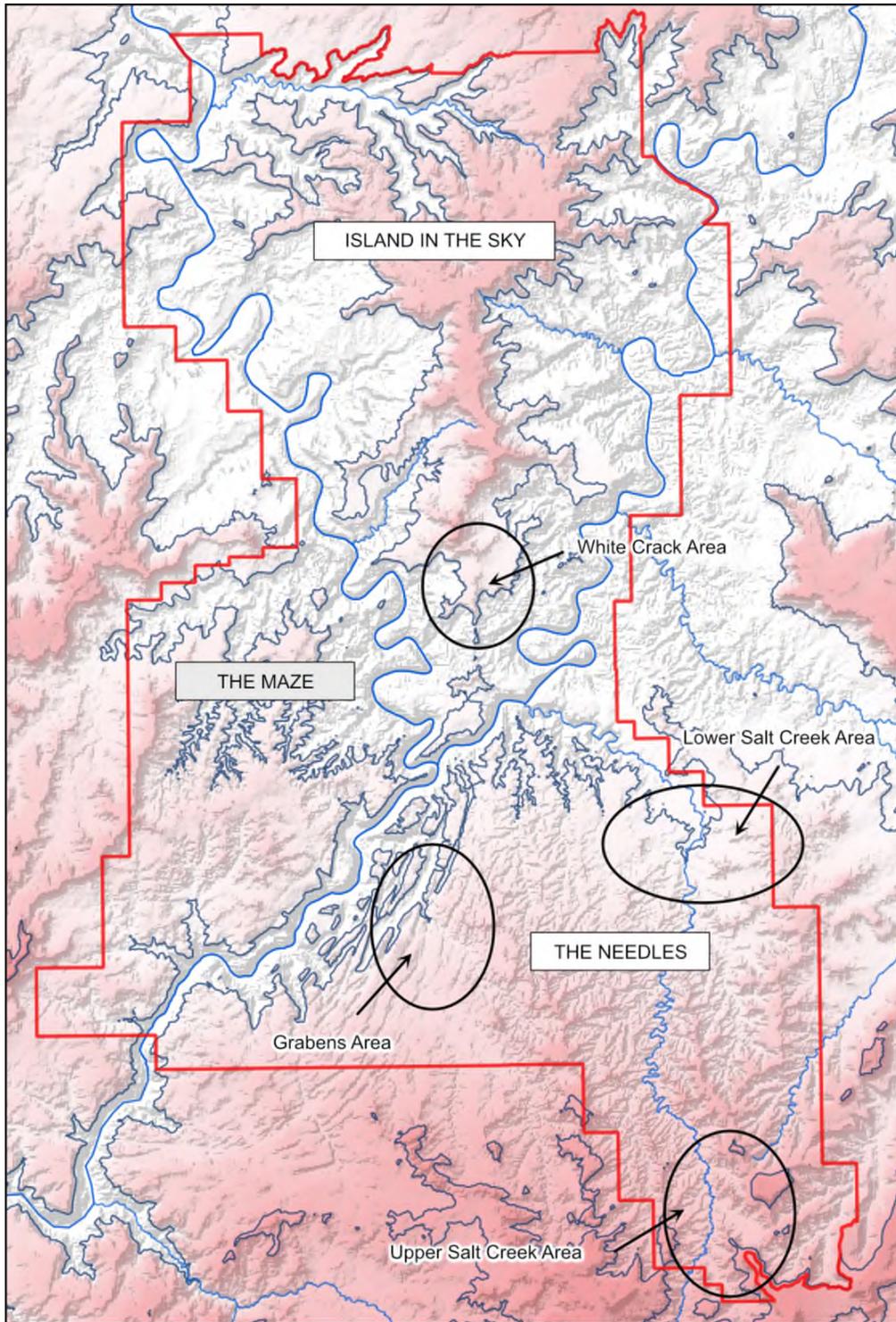


Figure 2. Map of the general inventory areas within Canyonlands National Park over the six field seasons. The Grabens Area includes Devils Lane and Butler Flat inventory areas, the Lower Salt Creek Area includes the Salt Pocket and Squaw Butte inventory areas, and the Upper Salt Creek Area includes the Big Pocket and Salt Creek inventory areas.



Figure 3. Terrain and topography of Upper Salt Creek Area. A crew member is recording a site on the ground level (42SA17789).

and his crew were primarily searching for structural sites and rock art, missing sites in the open expanses of the canyon, despite the claim of an intensive survey.⁴

Limitation of Inventory Data

Although a research design was required as part of the contract, Tipps and Hewitt (1989:17,18) note the inherent problems and limitations of using inventory data to address archeological research issues. One limitation of the Canyonlands Archeological Project is that the inventoried areas for most years were selected by the NPS primarily based on management needs, not based on archeological research issues. Even though statistical sampling for archeological inventory was common in the 1970s and 1980s (Thompson 1978; Tipps 1988), the areas selected for inventory by the NPS were not a statistical sample. Without statistical

sampling and randomization, the results of the inventory cannot be used to extrapolate to the park as a whole.

The interpretive quality of data from surface observations is limited compared to data recovered through excavation and associated laboratory analyses. No excavations were conducted during the project besides minor testing at the Downwash site in the Maze (Brown 1987). Excavation data from a single site can provide a significant quantity of artifacts for analysis and interpretation, buried features are exposed, and numerous samples for dating and laboratory analysis may be recovered. Without excavation data, even simple empirical observations regarding age and affiliation of a site may be incorrect.

Inventory projects such as the Canyonlands Archeological Project are limited to observations

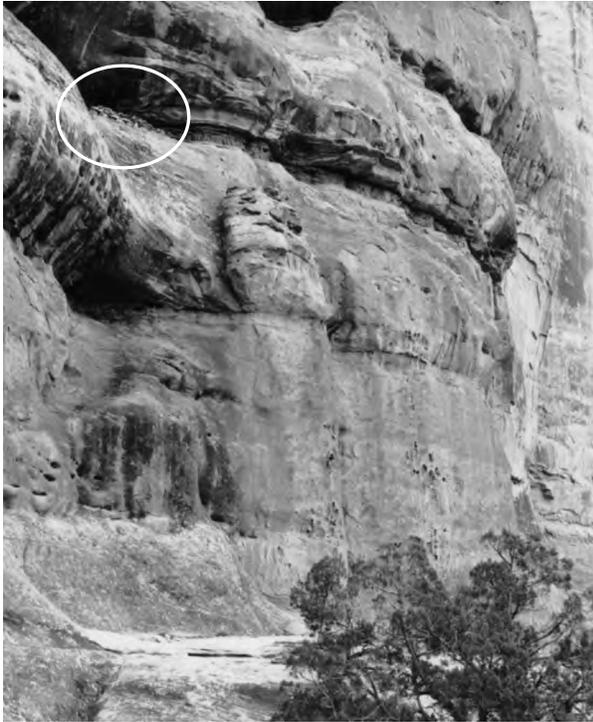


Figure 4. Inaccessible structure (circled) at limited activity site 42SA21124.

of visible features and surface artifacts. Surface data from an archeological site are biased in many ways and may not represent the actual age, function, or affiliation of the site. Multiple buried features may be present and the surface artifact assemblage may not be representative of the site assemblages that might be uncovered from excavation. Rare or low frequency artifact types may not be represented in the surface assemblage and some items like temporally diagnostic projectile points or potsherds may have been collected illegally by looters.

The Canyonlands Archeological Project was primarily a non-collection inventory,⁵ although a few hearths were sampled for radiocarbon dating and plant identification. Five radiocarbon dates obtained by the NPS from several rock art sites were reported as part of this project (Tipps 1995).

Pottery sherds were typed in the field which introduced some bias because of the varying analytical experience of differing crew members over the

years of inventory. Some black-on-white sherd designs and other potentially diagnostic artifacts were hand drawn in the field, but no artifact photos were taken. The contract requirements did not stipulate artifact photos or scale drawing, only that an overview photograph of each site be taken so that it could be relocated.

Despite these constraints of inventory data, the most important contribution of the project was documenting that Archaic period hunter-gatherers intermittently utilized the Needles and the Island in the Sky districts and confirming Sharrock's (1966) finding that the Formative period occupation of the Needles District is represented solely by Mesa Verde Anasazi. The project, along with additional radiocarbon dates provided by the NPS, also demonstrated this occupation was during the Pueblo III period, the last period before the Mesa Verdeans emigrated from the region.

Throughout this report, the term Anasazi as defined by A.V. Kidder (Kidder 1927) is used as the technical archeological term to encompass the Basketmaker-to-Pueblo stages or periods and the geographic regions or traditions of the northern American Southwest. Since the 1990s, the NPS has substituted the term Ancestral Puebloan for the term Anasazi, but the term Ancestral Puebloan lacks specificity about material cultural traits and geographic boundaries that are of continuing interest in understanding the Formative era occupations along the Colorado River and in differentiating between the Anasazi and Fremont traditions.

Because differentiating between these two Formative traditions is of continuing interest, this report classifies the Formative archeological sites by the Pecos Classification and geographic traditions or regions. A major finding of the project is that all the Formative sites can be assigned to the cultural tradition of the Mesa Verde region (Breternitz et al. 1974; Kidder 1962).

Chronological Framework for Canyonlands National Park

The park is an arbitrary area surrounding the

confluence of the Green and Colorado rivers and divided into three administrative districts, the Needles District, the Island in the Sky District, and the Maze District. The contract was initiated in 1985 with the first year of archeological work in the Salt Creek Pocket and Devils Lane areas of the Needles District (Tipps and Hewitt 1989). For the next four years, the inventories focused on the Needles District. In 1990, the final year of archeological inventory and hearth sampling was conducted in the White Crack area of the Island in the Sky District because of planned campground developments in the area. No inventory was conducted in the Maze District as part of the project.

Table 3 presents the general chronological framework that is used to interpret the prehistoric occupation in the three districts in the park: the Paleoindian, Archaic, Formative, and Protohistoric periods. However, the archeological record of each of the three districts varies in the degree to which there is evidence for these different chronological periods. Because the majority of the fieldwork was conducted in the Needles District, the chronological discussion that follows is primarily related to the chronological periods identified by the inventories of the Needles District.

The Paleoindian period is the earliest time period

Table 3. Final Chronology of the Canyonlands Archeological Project.

Period	Date Range
Paleoindian Period	13,000 BC–7800 BC
Clovis	13,000 BC–12,500 BC
Folsom	12,500 BC–12,200 BC
Late Paleoindian	12,200 BC–7800 BC
Archaic Period	7800 BC–AD 500
Early Archaic	7800 BC–5100 BC
Middle Archaic	5100 BC–2200 BC
Late Archaic	2200 BC–AD 500
Formative Period	AD 500–AD 1300
Basketmaker III	AD 500–AD 750
Pueblo I	AD 750–AD 900
Pueblo II	AD 900–AD 1150
Pueblo III	AD 1150–AD 1300
Protohistoric Period	AD 1300–AD 1850
Historic Period	AD 1850–present

present in the Needles District. This period is subdivided into technocomplexes defined by distinctive fluted and stemmed projectile points. Early Paleoindian technocomplexes are associated with extinct Pleistocene megafauna. Only a single base of a fluted Clovis point was found in the Needles District that is diagnostic of this period.

The economy of the Archaic period, which succeeds the Paleoindian period, is differentiated from the earlier Paleoindian period by an exploitation of a variety of plants and animals, with the game animals including deer, bighorn sheep, and rabbits. The Archaic of southeastern Utah and the remainder of the northern Colorado Plateau is usually subdivided into Early, Middle, and Late Archaic subperiods based on differing styles of dart points. These same labels are used to identify cultural affiliation as well as time periods, e.g. Early Archaic people or Late Archaic populations.

In Arizona and New Mexico on the southern Colorado Plateau, different Archaic traditions or affiliations are identified, including the Cochise and Oshara traditions respectively, with differing styles of projectile points but with the same hunting and gathering economy. The Archaic occupants of Canyonlands National Park mostly share the projectile point styles of the northern Colorado Plateau, rather than those of the Cochise or Oshara traditions to the south.

In the first report of the Canyonlands Archeological Project (Tipps and Hewitt 1989:20), stemmed Gypsum points were listed as the diagnostic point of the Late Archaic period and the point and period were dated to 1700 BC–AD 500. The beginning date for the Late Archaic has been confirmed by a Bayesian chronological model for the Canyonlands area (Appendix D). The ~AD 500 date for the end of the Late Archaic period is the date used for the introduction of pottery to the Mesa Verde region (Lucius 2020).

The Formative period within the park is defined by the presence of an agricultural economy with pottery and masonry habitation sites. As shown in Table 3, Kidder (1927) developed a chronological sequence for the Formative with temporal subdivisions labeled by Roman numerals.

One of the research issues across the American Southwest is determining when the Archaic economy of hunting and gathering ends and reliance on domesticated crops and pottery-making village life begins. While there are numerous agricultural communities dating to the Early Agricultural period outside the park, there are few culture traits or temporally sensitive features meeting the definitions of the Basketmaker II, Basketmaker III, or even the Pueblo I periods within the the areas inventoried. Pottery is discussed in Appendix B.

Across the Mesa Verde region, the Pueblo II period dates to AD 900–1150 and Pueblo III period dates to AD 1150–1300. Based on Sharrock's (1966:63) conclusions, the expectation before beginning the Canyonlands Archeological Project was that the major occupation of the Needles District would be during the Pueblo II period; however, the Canyonlands Archeological Project found

that the major Formative period occupation of the Needles District was during the Pueblo III period, as demonstrated in the remaining chapters.

AD 1300 marks the beginning of the Protohistoric period or Pueblo IV across the northern Colorado Plateau, when Utes, Southern Paiutes, and Navajo immigrate to the plateau. This period is only minimally represented in the park.

History is generally defined as the time when written records are available for a region. In some parts of the Southwest, the Historic period begins as early as the 16th century. In western Colorado, some archeologists end the Protohistoric period and start the Historic period with the final expulsion of the Utes to reservations at AD 1881 (Martin et al. 2005).

For the area, historic records begin with the Macomb Expedition of 1859 when Captain John Macomb documented prehistoric ruins in Indian Creek and Harts Draw (Pierson 1981:81). Mehls and Mehls (1986), under their contract, were charged with the recordation of historic sites in the park.

SUMMARY OF THE UPPER SALT CREEK AREA INVENTORY, NEEDLES DISTRICT

This section summarizes the results of two seasons of intensive archeological inventories in the upper Salt Creek and Big Pocket areas of the Needles District (Figure 5). This report summarizes the inventory results for the Upper Salt Creek Area for the first time.

The summary presented here has been compiled from site forms, field notes, photos, and draft documents from the 1980s and 1990s. This sum-

mary is not intended to supplant or recapitulate the descriptive information presented in the site forms, but rather to summarize and present the archeological data recorded by P-III Associates during the 1986 and 1989 seasons of fieldwork in upper Salt Creek and Big Pocket in the Needles District.⁶ No federal or state funds were provided to prepare this summary. The goal of providing this information is to make the archeological data available to the in-



Figure 5. General terrain of the Upper Salt Creek Area.

terested public and professional archeologists.

Setting and Natural Resources

The Upper Salt Creek Area was predominately occupied by prehistoric farmers, so a brief review of the climate, soils, and water resources of the area is important to an understanding of the occupation. The Colorado and Green rivers are the only perennial rivers in Canyonlands National Park. Principal drainages of the Needles District are Butler Wash, Davis Canyon, Indian Creek, Lavender Canyon, and Salt Creek which drain the western slopes of the Abajo Mountains and Beef Basin and flow into the Colorado River.

Salt Creek is the longest of the streams flowing across the Needles District to the Colorado River (Figure 6). It is about 31 miles (50 km) long and in short stretches has perennial flow fed by springs. The NPS selected the upper reach of Salt Creek and adjacent Big Pocket for inventory because this is where there is permanent water associated with the densest concentration of prehistoric masonry

sites. Other areas in the Needles District (like the Grabens) lack springs or water sources; the availability of surface water undoubtedly affected the prehistoric uses of these different areas.

Within Canyonlands National Park, the uppermost geologic layer is the Navajo Sandstone of the Glen Canyon Group and the bottom is the Paradox Formation of the Hermosa Group. In the Upper Salt Creek Area, the rock outcrops forming the canyon walls are from the Cedar Mesa Sandstone of the Cutler Formation (Figure 7). Although the Cedar Mesa Sandstone is noted for its red jasper or chert, the sandstones in the inventory area are generally devoid of such material. The only readily available lithic material is a pale gray limestone occurring as boulders and smaller rocks which occasionally were exploited for knapping stone tools.

The area inventoried ranges in elevation from 5760 ft to 6200 ft (1756 to 1890 m) above sea level. Soils in the inventory area are classified by the U.S. Department of Agriculture, Natural Resource Conservation Service (NRCS 2011) as eo-



Figure 6. Upstream view of Salt Creek depicting the historic downcutting of the alluvial terraces.



Figure 7. Cedar Mesa sandstone outcrops in Upper Salt Creek Area. A crew member is standing on the upper vegetated ledge.

lian sands with Quaternary alluvium on some slopes. The soils are not particularly favorable for dry-land farming of corn.

The plant cover of the inventory area is desert shrub with a sagebrush-saltbush community (Figure 8). Pinyon-juniper covers the uplands above the inventory area such as Cathedral Point, Beef Basin, and Cathedral Butte. Some relict stands of Douglas fir are also found in the area.

Fauna observed by the crews include mule deer, pack rats, coyotes, rabbits, birds, and reptiles. Occasionally the field crew inadvertently entrapped deer in some of these side canyons, a strategy that could have been employed to advantage by prehistoric hunters. Today, mule deer are ubiquitous in Big Pocket, though obviously this concentration is largely due to their protection in the park. Recent sightings in the area include bear

which have come down from the Abajo Mountains although the crew did not encounter any in the 1980s.

Upper Salt Creek Area Inventory Results

During 1986 and 1989, 145 separate chronological components were documented among the prehistoric sites in the Upper Salt Creek Area (Table 4). Two sites (42SA17790, 42SA21117) had both Archaic and Anasazi components. One site (42SA17216) had both an Early and Late Archaic component. Eighteen sites could not be assigned a time period and are labeled prehistoric.

Seventy-nine percent or 115 components were assigned to the Mesa Verde Anasazi tradition. Cross-dating of pottery sherds (Table 5; Appendix B) supports a Pueblo III date for these components and sites. Nineteen of these sites were previously

Table 4. Frequency of Components by Time Period and Site Type in the Upper Salt Creek Area. ^a

Site Type	Archaic	Anasazi	Prehistoric	Total
Limited Activity Site	12	71	18	101
Great Kiva		1		1
Fieldhouse		27		27
Habitation Site		16		16
Total	12	115	18	145

^aSite 42SA17790 and 42SA21095 have both an Archaic and Anasazi component.

recorded by Sharrock (1966) and were re-recorded during this inventory. No Protohistoric sites were recorded in the Upper Salt Creek Area.

Unknown Prehistoric Sites

The inventory documented 18 prehistoric sites for which dating or cultural affiliation could not be determined. All 18 of these prehistoric sites are classified as limited activity sites and are located in the open. Temporally or culturally diagnostic artifacts or features are not present on the surface of these sites. Two prehistoric sites (42SA17822,

42SA21109) are petroglyphs with no other cultural remains. Two other prehistoric sites (42SA21106, 42SA21107) are lithic source areas where the reduction of raw toolstone material took place as evidenced by cores and debitage among the raw material. The presence of chipped stone plus ground stone (one-hand manos and metates), hearths, or both on ten prehistoric sites indicates they probably functioned as short-term campsites. Four sites only have concentrations of non-diagnostic chipped stone tools and debitage.



Figure 8. General view of Upper Salt Creek Area.

Table 5. Total Count of Pottery Sherds on Sites in the Upper Salt Creek Area.

Pottery Type	Count
Mesa Verde White Wares	
Mesa Verde Black-on-white	92
McElmo/Mesa Verde Black-on-white	335
McElmo Black-on-white	105
Mancos Black-on-white	37
White Ware body sherds	444
Mesa Verde Gray Wares	
Mesa Verde Corrugated	35
Dolores Corrugated	48
Mancos Corrugated	4
Corrugated body sherds	794
Mancos Gray	3
Gray Ware body sherds	253
Mesa Verde Red Ware	
Abajo Red-on-orange	2
Red Ware body sherds	1
Kayenta Types	
Tusayan Corrugated	1
Tusayan Polychrome	1
Tusayan Black-on-red	3
Medicine Black-on-red	1
Hopi Types	
Orange body sherds	1
Total	2160

Archaic Period Sites

Twelve sites have components dating to the Archaic period based on either a radiocarbon date or the presence of diagnostic dart points. These Archaic sites in the Upper Salt Creek Area expand the documented location of Archaic use of the park. The eight single component Archaic sites are located in the open and all of them are concentrations of chipped stone tools and debitage with hearths.

Ten of the Archaic sites have one or more hearths or burned organic stains visible on the surface, suggesting that cooking plant or animal foods

was the main activity on these sites. Charcoal from seven of the hearths was radiocarbon dated to the Archaic period (Figure 9, Table 6). Three Sand Dune Side-notched points, evidence of the Early Archaic (Tipps and Hewitt 1989), are noted in the Upper Salt Creek Area. Large side notch points (cf. Tipps and Hewitt 1989) are also present on some of the Archaic sites, but these have a long time span and cannot be assigned a particular temporal period.

A single Elko point recovered from site 42SA21091 may date to the Archaic because the site lacks any other chronological markers. Ground stone in the form of one-hand manos or metates is present on nine of the Archaic sites. Besides the Sand Dune Side-notched points and large side and corner-notched points, two Gypsum points were also identified in the Upper Salt Creek Area.

Formative Period Sites

The majority of components, some 115, are assigned to the Mesa Verde Anasazi tradition based on pottery, diagnostic features, or masonry architecture (e.g. Figure 10, Figure 11). Pottery cross-dating dates these components to the Pueblo III period (AD 1150–1300). The 115 Formative period components are classified into four site types: limited activity areas, fieldhouses, habitation sites, and a possible great kiva (Appendix G; see Table 4).

Limited activity areas are defined based on the presence of chipped stone and pottery sherds, sin-



Figure 9. Cross-section of Feature 8 from limited activity site 42SA21095 dated to 5480–4995 cal BC.

Table 6. Characteristics of the Archaic Components in the Upper Salt Creek Area.

Site Number	Time Period	Number of Hearths	Ground stone Present	Diagnostic Artifacts	Laboratory Number	Conventional Radiocarbon Age BP	95% Probability Date Range (cal BC/AD)
42SA17215	Early Archaic	3	Yes	Sand Dune Side-notched point	Beta-16596	8830±110	7580–7075 BC
42SA21095 ^a	Early Archaic	12	Yes	None	Beta-69317 Beta-31963	8700±90 6290±110	8175–7580 BC 5480–4995 BC
42SA17107	Early Archaic	?	Yes	Atlatl weight	Beta-18737 Beta-31790	8340±290 5890±70 BP	8200–6640 BC 4945–4550 BC
42SA17216 ^a	Early Archaic	10	Yes	None	Beta-19285	8100±220 BP	7580–6530 BC
42SA17790 ^a	Early Archaic	3	Yes	None	Beta-18736	6580±100 BP	8200–6640 BC
42SA17816	Early Archaic	1	No	Sand Dune side-notched point			
42SA17768	Early Archaic	7	Yes	Pinto point			
42SA17774	Middle Archaic	15	Yes	Large side-notched point			
42SA17216 ^a	Late Archaic	10	Yes	Corner-notched point	Beta-19284	1720±80 BP	AD 130–545
42SA21117	Late Archaic	7	No	None	Beta-31964	1670±80 BP	AD 230–570
42SA17781	Late Archaic?	1	Yes	Elko Corner-notched point, two Gypsum points			
42SA21091	Late Archaic?	3	Yes	Elko Corner-notched point			

^a Multicomponent site.



Figure 10. Alcove habitation site 42SA21108.

gle masonry walls, stone circles (Appendix I), or the presence of storage features and rubble measuring less than 10 m². Fieldhouses are defined as small masonry buildings, presumed to have been seasonally occupied (Kohler 1992).

Habitation sites are differentiated from fieldhouses based on the presence of three or more surface living rooms plus evidence of multiple domestic activities. Where individual rooms could not be defined in rubble mounds, estimates of the number of rooms follow Adler's formula (1992:12) that 10 m² of rubble represents one living room.

One possible great kiva site that had originally been recorded as an open habitation site by Shar-

rock was re-recorded (42SA1627). No special use sites such as agricultural features associated with water control or pottery kilns were discovered during the inventory of the Upper Salt Creek Area.

Limited Activity Sites

Seventy-one limited activity Anasazi sites are present in the inventory area. Two of these sites (42SA17790, 42SA21117) are multicomponent with both Archaic and Anasazi components. The large number of limited activity sites relative to the other site types reflects the frequency of activities that were conducted away from nearby masonry habitation sites or "home pueblos" (Gleichman and Gleichman 1992:25; Rohn 2006:156). Only 22 of these limited activity sites are under the shelter



Figure 11. Masonry structure at alcove habitation site 42SA17786.

of an alcove. Corn was preserved at seven of the sites sheltered under alcoves.

Lithic reduction was the most common activity represented within the limited activity sites. Plant processing and grinding of corn or wild plant foods was also a common activity at these sites, represented by 53 of the sites having bedrock grinding slicks and portable ground stone artifacts including one- and two-hand manos, metates, and axes.

Storage of crops was another common prehistoric activity represented by the limited activity sites. Ten of the sites have masonry granaries. Six of the sites have slab-lined storage bins or cists. Granaries are small masonry structures assigned the function of a granary because they exhibit construction traits like wet-laid masonry walls for storing and protecting vegetal products.

There are 19 total granaries at the limited activ-

ity sites and the number of granaries per limited activity site ranges from one to five. The site with five granaries (42SA21131) was inaccessible and was visually recorded from a distance with binoculars. This lack of accessibility of the granaries and some of the cliff dwellings has been a noted feature of Salt Creek archeology since the first surveys of the area by Pierson (1962) and Sharrock (1966).

Four of the limited activity sites have only granaries present and one is solely represented by rock art. The rock art site (42SA21112) consists of a white negative left hand and seven white dots in a horizontal line. No artifacts are associated with this rock art panel.

Rock art is present at 11 of the limited activity sites and all of these sites have pictographs of hands or anthropomorphs. Only one site in the inventory area depicted a child's hand and this was at one of the limited activity sites (42SA21100).

The child's negative hand print was painted along with 15 adult-sized hand prints, all in white pigment.

Fieldhouse Sites

Twenty-seven fieldhouse sites are present in the Upper Salt Creek inventory area. Fieldhouses are defined by the presence of one or two living rooms and are interpreted as providing summertime or seasonal shelter for farmers tending their fields and temporarily storing the harvest. The floor area of the 34 individual living rooms in fieldhouses averages 7 m². Twenty fieldhouse sites are built under the shelter of an alcove along the canyon walls. Corn is preserved at six of the fieldhouses sheltered under an alcove.

Twenty-five fieldhouse sites were locations where stone tool manufacture and maintenance took place. Ground stone artifacts and features were common at these sites with 21 of the fieldhouses having bedrock grinding slicks, manos, metates, or axes. Storage facilities were also common with nine fieldhouses having granaries and seven having slab-lined storage bins or cists. The number of masonry granaries at the fieldhouse sites ranges from one to four. Seven of the fieldhouses have rock art. Two sites have dots or circles. Two others have white sprayed hands. The remaining three sites have various combinations of hand prints, anthropomorphs, zoomorphs, curvy lines, and a sawtooth design.

Great Kiva

A single possible great kiva site was rerecorded during the inventory. In 1965 Sharrock recorded this locale as an open habitation site (42SA1627) with three masonry surface rooms and seven sherds of McElmo Black-on-white and one Mancos Black-on-white. Apparently, he missed the large circular depression measuring roughly 12–21 m (40–70 ft) diameter. Great kivas are defined by diameters exceeding 10 m (32 ft) (Lipe and Ortman 2000; Van Dyke 2002). Based on surface evidence, this buried structure is large enough to be a great kiva. The three associated masonry rooms that are visible on the surface are relatively large (a

total of 26 m²), which is why Sharrock classified this as an open habitation site, but many other Pueblo II-III great kivas are associated with what appear to be storage rooms (Lipe 1992:221) rather than living rooms.

Habitation Sites

Sixteen habitation sites are identified based on the presence of three or more living rooms along with a variety of artifacts and features indicative of more-or-less permanent site occupation (Tipps and Hewitt 1989). Ten of these sites are under an alcove and could be called cliff dwellings (Figure 12). Corn is preserved at seven of the alcove habitations sites, squash at three of the habitation sites, and cotton at one of them.

The largest habitation site in the inventory area is Big Ruin (42SA1586) (Figure 13) with 32 structures including 15 living rooms (Metzger and Chandler 1986) (Figure 14, Figure 15). This is the largest habitation site or cliff dwelling in the park. Two habitations sites in rock shelters (42SA21108, 42SA21120) have 17 rooms each (Figure 16). Two other large open habitation sites were identified in the inventory area. Based on the size of the rubble mounds, 42SA1615 had 20 surface living rooms, and 42SA17789, 14 living rooms.

The average number of living rooms per habitation site is 7.4 and the total number is 119. This room count includes five small kivas with a small kiva defined by Adler and Wilshusen (1990) as a circular masonry structure measuring less than 10 m in diameter and with features like vents and niches.

Seven of the habitation sites have masonry granaries and four have slab-lined storage bins or cists. Corn is present at seven of the habitation sites and squash at three. In Sharrock's (1966) documentation of Big Ruin (42SA1586), he reported corn, squash, and cotton. Additional corn and cotton cordage were found during stabilization activities at the site (Metzger and Chandler 1986).

Rock art is only present at three habitation sites (42SA1581, 42SA1586, 42SA21108). Site 42SA21108 has four negative handprints, all left



Figure 12. Alcove habitation site 42SA17119.

hands in white pigment and one pecked “∞” design (Figure 17). Site 42SA1581 has 31 white dots in a horizontal line and 3 dots of red clay. Big Ruin (42SA1586) has rock art plus designs scratched in a plastered small kiva. Two white handprints are in the upper level, 12 brown lines and 2 red stains are on the cliff base, and historic inscriptions and petroglyphs of humans on horseback are at the base of the cliff (Metzger and Chandler 1986:93). In the upper level of Big Ruin, Structure 8 is a circular structure of wet-laid, single stone construction with plastered walls interpreted as a small kiva. Eight circular white dots appear on the interior wall along with a scratched scorpion-like figure and anthropomorph (Metzger and Chandler 1986).

Small Kivas. Five small kivas were documented by the Canyonlands Archeological Project among the habitation sites. These rooms lacked some of the features typical of Pueblo III Mesa

Verde kivas (no banquette, southern recess, pilasters), but due to their size or associated features, they are considered small kivas. All of the kivas, great and small, are essentially circular in their floor plan.

Two of the sites with small kivas, 42SA17778 and 42SA17826, were built in the open in alluvial terraces, so only the diameters of the subsurface structures are measurable with a 9 m diameter and 1.5 m deep depression at 42SA17778 and a 5 m diameter and 0.75 m deep depression at 42SA17826. The latter site has sandstone blocks visible in a circular alignment around the circumference of the depression.

Three alcove habitation sites had circular structures that appear to be small kivas (42SA1586, 42SA21108, and 42SA21120). All three masonry structures on these sites were essentially circular in plan, with diameters of 5.3 m, 4.8 m, and 3 m, respectively. No pilasters are present, so the walls

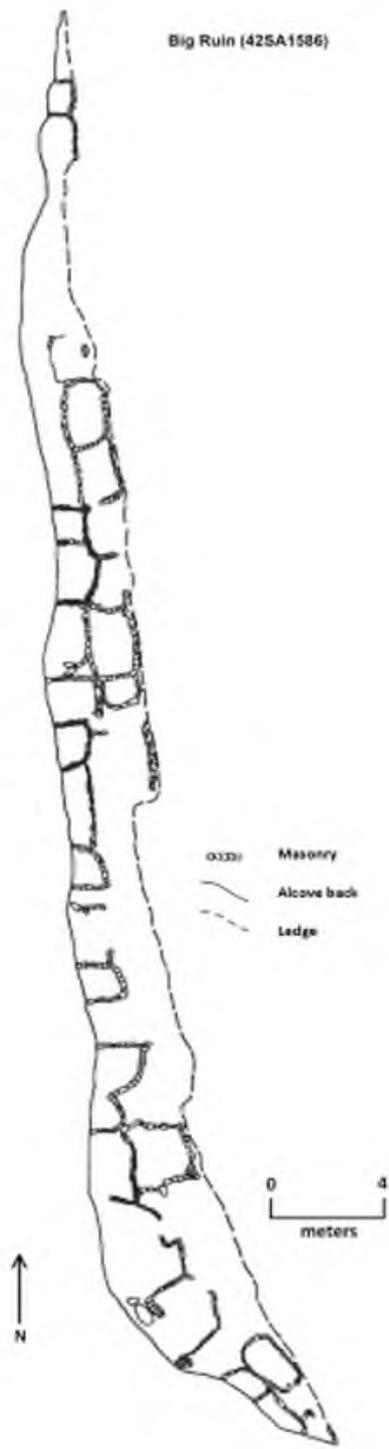


Figure 13. Plan map of Big Ruin (42SA1586), the largest Anasazi site in Canyonlands National Park, prepared by Nickens and Associates (Metzger and Chandler 1986).



Figure 14. Masonry structures at Big Ruin (42SA1586) (Metzger and Chandler 1986).

would have directly supported beams if the structures were roofed. No evidence for a roof was present in 42SA1586, but the other two sites had beam fragments and casts of beams in the fill indicative of roofing material.

Information presented on the kivas is based solely on surface observations and exposed masonry. Flooring was not visible in 42SA1586, 42SA21108, and while there is fill covering the floor in 42SA21120, the top stones of a square, slab-lined hearth are visible above the fill.

Roofed Mesa Verde kivas have a ventilator defined as a narrow L-shaped tunnel through the wall at floor level that rose to an opening outside. Typically, the ventilators were lined with masonry. At 42SA1586, the kiva (Structure 8) had a vent open-

ing and two D-shaped niches. Site 42SA21108 has a small vent or entry in the south-southeast part of the wall. The feature is 38 cm wide with a lintel block that is 60 cm long and 24 cm high. Site 42SA21120 also has a vent in the south wall, or at least a large opening that may have been a vent hole. The gap is 66 cm wide.

The kiva at site 42SA1586 had a plastered interior wall with painted white splotches and scratched zoomorph and an anthropomorph on the interior wall. This was also one of the rare rooms or structures that showed two phases of construction with different mortars. At 42SA21108, the kiva walls are partially mudded, but not smoothly plastered. At 42SA21120, portions of the interior kiva walls between the boulders are smoothed over



Figure 15. 1989 aerial view of Big Ruin (42SA1586), the largest cliff dwelling in Canyonlands National Park.



Figure 16. Alcove habitation site with small kiva, site 42SA21120.

with mortar. At 42SA1586, the kiva walls are wet-laid, with liberal mortar and single stone construction. At 42SA21108, the kiva walls are dry-laid, mudded, and wet-laid, and incorporate several natural outcropping sandstone boulders. The construction is uncoursed and a single stone wide. At 42SA21120, the kiva walls are built of unshaped stones that are a single stone wide. Portions of the interior walls between the boulders are smoothed over with mortar.

Lekson (2008) interprets prehistoric small kivas as having domestic and secular functions, rather than the ceremonial functions presumed for great kivas or reported for historic small kivas. The small kivas in the Upper Salt Creek Area appear to have had a domestic function because the differ-

ences between habitation sites with and without small kivas are minor: three of the sites with small kivas have preserved squash (42SA21108, 42SA21120), three have rock art (42SA1581, 42SA1586, 42SA21108); two have grinding slicks (42SA21108, 42SA21120), although 14 of the 16 habitation sites have manos and metates present. Otherwise, there are no apparent differences in artifact classes or features between the habitation sites with and without small kivas.

Rock Art in the Upper Salt Creek Area

No Archaic sites were associated with rock art. All rock art was located at either Anasazi or unknown prehistoric sites. Two of the prehistoric sites (42SA17822, 42SA21109) are petroglyphs with no other cultural remains. One depicts a circle

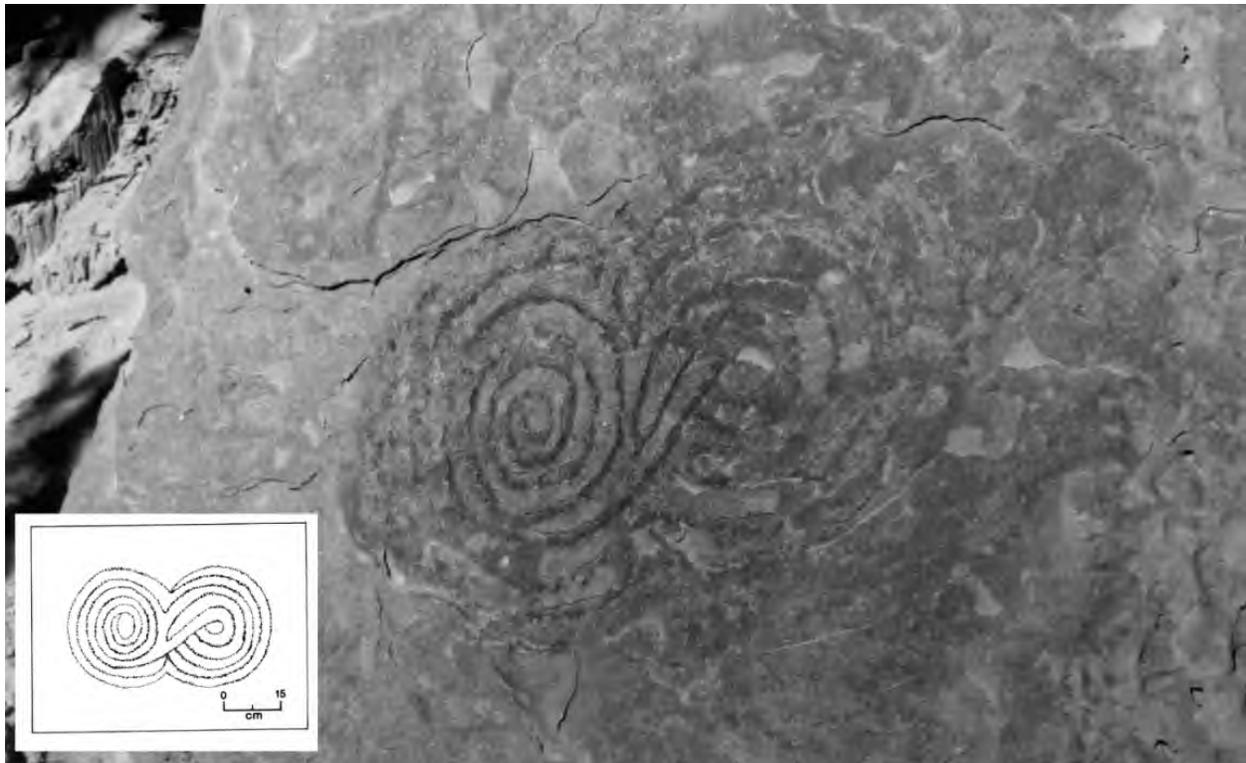


Figure 17. Petroglyph at alcove habitation site 42SA21108.

with a dot inside and curvy lines; the other has anthropomorphs and geometric and semicircular lines that could not be assigned a time period, style or cultural tradition.

Rock art primarily occurred at Anasazi limited activity and fieldhouse sites. The most common Formative design element is a painted hand print, whether stylized, negative or positive, found at 13 sites (Figure 18). Dots and circles are the next most common design element, found at 11 sites. Seven of the sites depict anthropomorphs (and these co-occur with hands at four sites). None of the anthropomorphs at these sites may be assigned a particular style such as the Faces Motif, although several Faces Motif panels are located just outside of the inventory area.

Zoomorphs of sheep or deer and the “scorpion-like figure” at Big Ruin occur at five sites (Figure 19); curvy lines occur at four sites; and triangles and straight lines occur at three sites. All of the rock art panels in the Upper Salt Creek Area are

examples of Noxon and Marcus’ Canyonlands Anasazi Style (1985).

One of the unusual findings of the inventory of the Upper Salt Creek Area is that almost all rock art occurs at the Anasazi sites with the shortest duration of use; i.e., limited activity sites and fieldhouses where hands, anthropomorphs, and dots and circles are the main design elements. While attributing meaning to rock art is speculative, it might be worth noting that Ellis (1978) found historic Puebloan fieldhouses belonged to specific individuals, and by analogy based on Ellis’ observation, Kohler (1992) argued that prehistoric fieldhouses in the Dolores area of the Mesa Verde region were constructed and maintained as visible symbols of land and field ownership or control. Perhaps the frequent depiction of hands in the Upper Salt Creek Area fieldhouses and limited activity sites was symboling personal ownership or control of fields and crops. Or they might simply represent an effort to ward off boredom while tend-



Figure 18. Example of negative Anasazi hand print, site 42SA21112.

ing to crops.

Analyzing rock art in Pueblo II-III sites in Hovenweep and Mesa Verde national parks, Olsen (1983, 1984) found that zoomorphs (bird tracks and mountain sheep) occurred most often at sites with kivas and storage facilities, spirals occurred at water control features, and anthropomorphs at small habitation sites. Across southeastern Utah, Hartley (1990) found that rock art elements varied between habitation sites and storage facilities. A different pattern is seen in the Upper Salt Creek Area where rock art occurs at the sites with the shortest duration of use and hand prints and anthropomorphs are the most common design elements. In other words, the people who were temporarily or seasonally residing near their fields painted hands or human images when they were not making stone tools, grinding corn, or tending their fields. Ethnographic references note that chil-

dren and old men watched the fields as corn ripens (Cushing 1884:94). Only one child-sized handprint was depicted among the many painted hands and it was on a limited activity site with one granary.

Formative Food Processing and Storage in the Upper Salt Creek Area

Aside from ubiquitous evidence of the manufacture and maintenance of chipped stone tools, a common activity represented by artifacts and features at the Anasazi sites was the grinding of corn or other foodstuffs: ground stone manos or metates are present at 81 of the sites and grinding slicks are present at 19 sites. Two-hand manos were present at 22 of the sites and these tools correlate with corn agriculture and a need for efficiency in grinding corn kernels (Hard et al. 1996).

Storing corn was the next most common activity as evidenced by 26 sites with masonry granaries. The number of granaries per site ranged from one to five. The floor area enclosed by these storage facilities was about 156 m² with most of the storage area (94 m²) located at the habitation sites.

The limited number of slab-lined storage cists and storage bins at fieldhouses indicates that much of the fieldhouse use was probably seasonal. Based on analogy to historic Pueblo practices (Hough 1918), farmers would have moved into the fieldhouse sites during the spring to plant the fields and the fieldhouse sites were probably occupied intermittently during the summer and fall. Cushing describes the use of fieldhouses historically at Zuni: “As the corn ripens, you may see fires burning at almost any of the quaint little farm huts, for children or very old men watch there day and night, to keep crows, coyotes, and burros away” (Cushing 1884:93–95). In the Upper Salt Creek Area, adults appear to have been the main occupants of the fieldhouses because adult handprints are common. Only one child’s handprint was found during the inventory, so children may not have been occupying the fieldhouses or tending the fields.



Figure 19. Zoomorph pictograph and handprints at limited activity site 42SA21085.

Anasazi Population Estimates for the Upper Salt Creek Area

In documenting the habitation sites in the Upper Salt Creek Area, an attempt was made to differentiate living rooms from storage rooms so the prehistoric population could be estimated. The momentary population estimation method (Adler 1992; Schlanger 1988) multiplies number of living rooms in an inventory area by average room lifespan, by persons per living room, divided by the length of the occupation period. For the Upper Salt Creek Area, the number of living rooms is 119 and the average room lifespan is estimated as 20 years (Adler 1992). Because living rooms are small (average of 9 m²) and comparable to those on Wetherill Mesa in Mesa Verde National Park, Hayes' (1964) estimate of two people per living room is

applied.

While the momentary population method involves assumptions, the small size of living rooms between Wetherill Mesa rooms and those in Upper Salt Creek are similar. The duration or the length of occupation in upper Salt Creek is derived from a Bayesian chronological model presented in Appendix D. The model indicates the duration of occupation in the Upper Salt Creek Area was between 65 and 120 years resulting in an estimate of 40 to 73 persons for the number of people living in the Upper Salt Creek Area at any one time. This short interval of occupation in the area is supported by the absence of extensive middens or evidence of remodeling of the habitation sites that might suggest a much longer period of use.

SUMMARY OF THE INVENTORY RESULTS OF THE UPPER SALT CREEK AREA

In summary, the inventory of the Upper Salt Creek Area showed it was primarily used during two prehistoric periods; the Archaic and the late Formative or Pueblo III period. Twelve components date to the Archaic period: seven Early Archaic components, based on radiocarbon dates and projectile points, one Middle Archaic component, and four Late Archaic site components. Throughout the Archaic period, processing plant and possibly animal foods appears to have been the major activity because 10 of the 12 components had hearths for cooking or heating.

The inventory of the Upper Salt Creek Area resulted in the documentation of 115 components assigned to the Formative era. The inventory confirmed the conclusions of Sharrock (1966) and Pierson (1981) that the Formative occupation of the Upper Salt Creek Area was exclusively by peoples of the Mesa Verde Anasazi cultural tradition.

While Sharrock (1966:63) found that the occupation of the Needles District was restricted to the Mesa Verde branch of the Anasazi, he thought the occupation dated to Pueblo II, specifically to AD 1075–1150. This date range was derived from Sharrock's misidentification of temporally diagnostic pottery types (Sharrock 1966: Table 4). In contrast to Sharrock's conclusion about the dating of the prehistoric Formative occupation, the inven-

tory results date this occupation to Pueblo III, the last period of the Mesa Verde tradition.

These Formative people shared in regionwide Mesa Verdean stylistic conventions like the designs on Mesa Verde Black-on-white pottery and triangles or sawtooth images in pictographs (Figure 20). They also shared architectural traits like small kivas, t-shaped doorways (Figure 21), and relatively simple masonry construction techniques.

The inventory area was occupied by a small population, probably a maximum of 73 people at one time, who subsisted by dry-land farming of corn and squash starting in cal AD 1170–1220 and ending in cal AD 1275–1300, a span of 65 to 120 years. By about AD 1300 or 1305, the last of the Formative farmers abandoned the area.

These Formative farmers were participants in the regional Mesa Verdean tradition that includes nearby upland areas like Fable Valley, Beef Basin, and the Dark Canyon Plateau. Pierson called these people the Abajo Mountains Anasazi and said, "All in all, the impression one gets is of a small population of farmers busily engaged in farming, gathering, building and leaving all sorts of masonry buildings over a period of time as they made their living from the land" (Pierson 1981:54).



Figure 20. Sawtooth pictograph panel at fieldhouse site 42SA17800.



Figure 21. Masonry rooms with t-shaped doorway at an alcove habitation site with small kiva, site 42SA21108.

CANYONLANDS ARCHEOLOGICAL PROJECT RESULTS

With the summary of the 1986 and 1989 field seasons of inventory presented, it is now possible to summarize the results of the project. Table 2 presents the general results of the Canyonlands Archeological Project by inventory areas. Over 400 newly recorded sites were documented and 30 previously recorded sites were revisited and the site forms for these sites were updated. The field crews of the Canyonlands Archeological Project completed intensive inventory of more than 8600 acres within the park, almost all of it in the Needles District. The area inventoried in the Needles District during the project only represents about seven percent of the total Needles District area and with about 1000 sites currently documented for the Needles District, there are likely thousands more unrecorded sites within the park yet to be discovered.

Even though the Canyonlands Archeological Project only inventoried a small percent of the park, the project yielded some important and surprising results. First, the project demonstrated the presence of a long sequence of Archaic occupation in the inventoried areas in the Needles District and the Island in the Sky District. Throughout the Archaic period, toolstone reduction and processing plant and animal foods appear to have been the major activities.

Second, the overall project provided clarity and specificity about the small Mesa Verdean farming population that lived in the upper reaches of Salt Creek and Big Pocket and elsewhere in the park during the Pueblo III period (AD 1150–1300). The

project was able to correct Sharrock's (1966:63) conclusion that the major Formative occupation of the Needles District dated to the earlier Pueblo II period, before AD 1150. The archeological evidence compiled by the project showed that Sharrock was incorrect in his dating; instead, the major occupation was during Pueblo III, the last period before Pueblo people emigrated south from the Mesa Verde region. Third, as discussed in detail below, there is no evidence of Fremont habitations nor influence in the project areas. Below some specific results of the project are documented.

Radiocarbon Determinations of the Canyonlands Archeological Project

Over the course of the project, 21 sites were sampled for radiocarbon dates. In addition, four radiocarbon dates associated with rock art sites were reported by this project. All these dates are presented in Table 7 and include previously published and unpublished dates. Only features from aceramic sites and contexts, including one pigment sample from 42SA20615, were sampled in an attempt to develop a chronological understanding of aceramic sites in the park. All but four samples were recovered from surface features. An additional five pigment and charcoal samples associated with rock art sites in the park and from Bureau of Land Management lands were also first reported by this project.

One alcove site in the Lower Salt Creek Area, White Bird Shelter (42SA20165), had three radiocarbon dates (Tipps 1995). The oldest sample came from charcoal from a hearth about a meter

Table 7. List of Radiocarbon Dates from the Canyonlands Archeological Project.

Site Number	Laboratory Number	Conventional Radiocarbon Age BP	95% Probability Date Range (cal BC/AD) ^a	Feature Type	Feature Number	Type of Sample
42GR42 ^b	AA-9116	2100 ± 50	355 BC–AD 25	Pictograph	-	Pigment ^c
42SA17092	Beta-21209	3340 ± 110	1885 BC–1425 BC	Unlined hearth	Unnumbered	Charcoal/Soil
42SA17107	Beta-18737	8340 ± 290	8200 BC–6640 BC	Midden/Generic soil stain	1 and 2	Charcoal
42SA17107	Beta-31790	5890 ± 70	4945 BC–4550 BC	Midden/Generic soil stain	Unnumbered	Charcoal
42SA17141	Beta-21208	2080 ± 60	355 BC–AD 80	Slab-lined hearth	2	Charcoal/Soil
42SA17215	Beta-16596	8330 ± 110	7580 BC–7075 BC	Unlined hearth	2	Unknown
42SA17216	Beta-19284	1720 ± 80	AD 130–AD 545	Unlined hearth	2	Charcoal
42SA17216	Beta-19285	8100 ± 220	7580 BC–6530 BC	Unlined hearth	5	Charcoal
42SA17790	Beta-18736	6580 ± 100	5710 BC–5330 BC	Unlined hearth	1	Burned sediment
42SA20251	Beta-30481	1170 ± 60	AD 680–AD 995	Soil stain	1	Charcoal
42SA20256	Beta-30482	2220 ± 90	485 BC–AD 5	Slab-lined hearth	1	Charcoal
42SA20258	Beta-30483	1500 ± 100	AD 260–775	Oblong, slab-lined feature	1	Charcoal
42SA20292	Beta-30484	2120 ± 60	360 BC–AD 15	Slab-lined hearth	3	Charcoal
42SA20292	Beta-30485	2220 ± 70	405 BC–55 BC	Unlined hearth	1	Charcoal/Soil
42SA20301	Beta-30486	2640 ± 100	1045 BC–420 BC	Unlined hearth	2	Charcoal
42SA20301	Beta-30487	2330 ± 90	760 BC–175 BC	Unlined hearth	1	Charcoal
42SA20615	AA-9179	2710 ± 75	1045 BC–775 BC	Pictograph	-	Pigment ^c
42SA20615	Beta-30488	1360 ± 80	AD 550–AD 880	Unlined hearth	2	Charcoal/Soil
42SA20615	Beta-37954	5290 ± 80	4330 BC–3965 BC	Unlined hearth	16	Charcoal
42SA21091	Beta-31962	2070 ± 70	355 BC–AD 120	Slab-lined hearth	3	Charcoal
42SA21095	Beta-31963	6290 ± 110	5480 BC–4995 BC	Unlined hearth	8	Charcoal/Soil
42SA21095	Beta-69317	8700 ± 90	8175 BC–7580 BC	Unlined hearth	3	Charcoal
42SA21117	Beta-31964	1670 ± 80	AD 230–AD 570	Unlined hearth	2	Charcoal
42SA21263	Beta-69975	2820 ± 80	1210 BC–815 BC	Slab-lined hearth	2	Charcoal
42SA21267	Beta-69319	2350 ± 60	750 BC–205 BC	Unlined hearth	15	Charcoal/Soil
42SA21267	Beta-69320	2910 ± 90	1390 BC–845 BC	Slab-lined hearth	1	Charcoal
42SA21269	Beta-69321	1910 ± 60	45 BC–245 AD	Unlined hearth	1	Charcoal
42SA21285	Beta-69322	3410 ± 100	2010 BC–1455 BC	Slab-lined hearth	1	Charcoal/Soil
42SA21291	Beta-69323	3180 ± 90	1680 BC–1215 BC	Slab-lined hearth	11	Charcoal/Soil

Table 7. List of Radiocarbon Dates from the Canyonlands Archeological Project. (continued)

Site Number	Laboratory Number	Conventional Radiocarbon Age BP	95% Probability Date Range (cal BC/AD) ^a	Feature Type	Feature Number	Type of Sample
42SA21291	Beta-69324	2360 ± 60	755 BC–225 BC	Midden	2	Charcoal/Soil
42WN418	AA-8625	3400 ± 65	1885 BC–1530 BC	Pictograph	-	Pigment ^c
42WN665	Beta-64818	1860 ± 50	AD 30–AD 330	Unlined hearth	-	Charcoal ^c
42WN766	Beta-75861	2660 ± 80	1015 BC–545 BC	Uncertain	-	Burned sediment ^c

^a IntCal20 calibration curve (Reimer et al. 2020)

^b Originally reported by Tipps (1995) as site 42GR382. This site is outside of Canyonlands National Park.

^c Samples submitted by the NPS.

below the surface that produced a Middle Archaic radiocarbon date of 4330–3970 cal BC. Another sampled hearth in a cut bank near the surface of White Bird Shelter produced a Late Archaic/Early Agricultural period date of cal AD 540–830. A pigment sample from a Barrier Canyon rock art pictograph at the site dated to 1045–775 cal BC. This site had been extensively looted and the only typeable projectile point was an Elko Corner-notched point which spans the entire Archaic time period. Both Anasazi and Archaic rock art were observed at the site.

Features within stratified deposits were sampled at two other sites in the Upper Salt Creek Area. Three cultural horizons were discovered eroding out of a cut bank at site 42SA17107. Two features (F1, F2) at approximately 1.25 m below the ground surface were sampled in 1986 and a bulk sediment sample was later collected for flotation analysis. Samples from Feature 1 and Feature 2 were combined to obtain a single radiocarbon sample which produced an Early Archaic date of 8200–6640 cal BC. In 1989, a radiocarbon sample was collected from Feature 3 at this site which was about 40 cm below the ground surface. This sample dated to the Middle Archaic, 4945–4550 cal BC. The ground surface exhibited a scatter of flakes but no diagnostic artifacts were present.

Site 42SA17790 is a multicomponent site with both an Early Archaic and Anasazi component in

the Upper Salt Creek Area. A charcoal soil stain eroding out of a dune area on the alluvial terrace on this site produced an Early Archaic date of 5710–5330 cal BC. On the surface of the terrace were numerous one-hand manos, a few sherds, and rock alignments. Further to the south and east on a sandstone ledge under overhangs were several small masonry structures associated with Mesa Verdean pottery.

A second site from the Upper Salt Creek Area, 42SA21117, was also identified as multicomponent. The site, covering over 1000 sq m, consisted of a series of at least seven soil stains, scattered flakes and nondiagnostic tools, and a small Mesa Verdean pottery concentration. One of the stains on the edge of the site was sampled for radiocarbon dating and returned a Late Archaic date of cal AD 230–570. The sherds were not associated with this feature.

Ongoing research issues in the northern Southwest include differentiating between the adaptations of Middle Archaic and Late Archaic foragers and between Late Archaic foragers and Formative farmers (Geib 2011). On nearby Cedar Mesa and in Grand Gulch, Coltrain and others (2007) have shown that people were reliant on corn during Basketmaker II, a time period dated from 500 BC to AD 500. But there is no evidence of such early corn in any of the sites or areas investigated as part of the Canyonlands Archeological Project.

As listed in Table 7, the Canyonlands Archeological Project obtained radiocarbon dates from aceramic features in the Needles and Island in the Sky districts. While some of these dates fall within the Basketmaker II–III time periods (500 BC – AD 750), none of the sites producing these dates yielded evidence of corn or other cultigens, pottery, two-hand manos or trough metates, pit structures with storage facilities, or other evidence associated with farming populations or a Basketmaker lifeway. These sites and dates all represent a continuation of the Late Archaic lifeway in the Canyonlands area.

In the Needles District, there is an additional radiocarbon determination from White Bird Shelter (42SA20165) and two other sites (42SA8489, 42SA20251) that produced radiocarbon dates between AD 550–1000, but these sites lacked evidence of corn, pottery, or pithouses. For the Mesa Verde region, Wilshusen (2018) has recommended consolidating the time periods from Basketmaker III to Pueblo I (AD 500–920) into the Early Agricultural period, to reflect the intensive corn agricultural economy centered on large communities. However, the people utilizing the Needles District between AD 500 and AD 1170 continued to pursue a hunting and gathering lifeway. The radiocarbon dates, the pottery, and the inventory data show that the major use of the Upper Salt Creek Area was during the Pueblo III period.

An additional contribution of the Canyonlands Archeological Project was analyzing radiocarbon dates from rock art sites, as reported by (Tipps 1995). These dates include charcoal samples from the Harvest Scene (42WN665) and site 42WN766 in the Maze. Three pigment samples were dated, one from the Great Gallery (42WN418) in the Horseshoe Canyon Detached Unit, one from White Bird Shelter (42SA20615) in the Needles District, and one from the Bartlett Flat Pictograph Alcove (42GR42). Firor (2000) and Tipps (1995) identified this site as 42GR382 in their respective reports. These dates generally confirm Schaafsma's (1971) assessment that the Barrier Canyon style of rock art dates to the Late Archaic.

Plant Macrofossils

The Canyonlands Archeological Project processed bulk sediment samples from 22 features by froth flotation to recover plant remains. Fifteen features on 10 Archaic sites were sampled in the Needles District. Seven features on five Archaic sites were sampled in the White Crack area of the Island in the Sky. In addition to the floated sediment samples from the Upper Salt Creek Area, macrofossils of corn, squash, and cotton were found on the Anasazi sites. The plants identified in the sediment samples indicated that juniper, pinon, and sagebrush were used as fuel sources. The flotation samples that dated to the Archaic contained the following plants listed in order of decreasing ubiquity: cheno-ams (*Chenopodium-Amaranthus*), dropseed (*Sporobolus* spp.), Indian rice grass (*Achnatherum hymenoides*), Tansy-mustard (*Descurainia* spp.), and hackberry (*Celtis* spp.).

Cheno-ams and dropseed were the most ubiquitous seeds recovered from the flotation samples. These seeds could have been eaten raw or been parched, ground into a flour, and made into a mush. Dropseed is a warm season bunchgrass that grows in sandy, saline soils like those along Salt Creek. Indian rice grass is dominant over much of Utah's desert and semi-desert areas and the seeds of this cool-season grass were an Archaic and Paiute staple. The remaining plant taxa are commonly found in Archaic flotation samples from the region.

As mentioned above, corn (*Zea mays*) was found at 20 of the sites in the Upper Salt Creek Area, squash (*Cucurbita* spp.) at three, and cotton (*Gossypium* spp.) only at Big Ruin (42SA1586). Corn was observed at the limited activity sites, fieldhouses, and habitation sites, but only two sites (42SA1581 and 42SA21108) had more than 20 cobs each. According to Winter (1973:444), 20 cobs is the minimum number for a statistically valid sample of row numbers.

While the sample size is limited, 19% of the cobs documented by the Canyonlands Archeological Project were 8-rowed, another 19% were 10-

rowed, 38% 12-rowed, and 3% had 14 or more rows. The archeological importance of cobs with varying row numbers is likely a result of the people farming in the Needles District diversifying their crop varieties, possibly an adaptation to cope with variability in annual rainfall (Spielmann et al. 2011) and perhaps more importantly, to insure crop success.

Toolstone Use in the Needles District

The most common type of toolstone on the sites is red chert from the Cedar Mesa Sandstone formation. Summerville Chalcedony is another toolstone commonly found on the sites. Summerville Chalcedony is a high quality clear-to-white stone that comes from the uppermost unit of the Summerville formation. This formation is found in localities from Arches National Park to the La Sal Junction area where there are extensive surficial deposits of Summerville Chalcedony (Baker 1933:51).

Obsidian artifacts were exceptionally rare in the Needles District. Table 8 presents the result of hydration analysis and x-ray fluorescence analysis on eight obsidian artifacts from five sites by Thomas Origer and Richard Hughes. Three of the sites have unassigned temporal affiliations, but with the exception of the specimen from the Wild-

horse Canyon source in western Utah, the other obsidian sources are all south and southeast of the Needles District.

Chronological Periods in the Inventoried Areas

As noted above, fieldwork was conducted in four areas of Canyonlands National Park: in the Needles District the inventory areas were the Grabens Area, Lower Salt Creek Area, and the Upper Salt Creek Area, and in the Island in the Sky District, investigations were conducted in the White Crack Area. Table 9 presents a breakdown of the number of sites by chronological periods for these inventory areas and the following discussion summarizes the evidence for each period.

Paleoindian Period

The only evidence of Paleoindian presence in the Needles District was an isolated base of a fluted Clovis point (42SA20262) found near Squaw Butte similar to dozens of other lost or discarded Clovis points in Utah (Schroedl 2020). No features were radiocarbon dated to the Paleoindian period and no other unequivocal Paleoindian points, from any Paleoindian subperiod, were discovered during the inventories. There was no Paleoindian evi-

Table 8. Obsidian Sourcing and Hydration Results from the Canyonlands Archeological Project.

Site	Sample Number	Mean Micron Measurement	Source	Affiliation	Area
42SA18365	FS-2	2.0	Government Mountain-Sitgreaves Peak, AZ	Probable Late Archaic ^a	Grabens
42SA18367	FS-1	4.6	Cerro Del Medio, NM	Unknown Prehistoric ^a	Grabens
42SA18381	FS-1	4.3	Wildhorse Canyon, UT	Unknown Prehistoric	Grabens
42SA20289	A	2.7	Government Mountain-Sitgreaves Peak, AZ	Unknown Prehistoric	Lower Salt Creek
42SA20289	B	2.7	Government Mountain-Sitgreaves Peak, AZ	Unknown Prehistoric	Lower Salt Creek
42SA20289	C	2.9	Government Mountain/Sitgreaves Peak, AZ	Unknown Prehistoric	Lower Salt Creek
42SA20289	D	2.8	Government Mountain-Sitgreaves Peak, AZ	Unknown Prehistoric	Lower Salt Creek
42SA21083	FS-1	0.9	No Agua Peak, NM	Mesa Verde Anasazi	Upper Salt Creek

^aA single Mesa Verde Anasazi White Ware sherd was noted on both sites 42SA18365 and 42SA18367.

Table 9. Count of Sites and Components from the Canyonlands Archeological Project.

Period	Grabens Area	Lower Salt Creek Area	Upper Salt Creek Area	White Crack Area	Total
Paleoindian		1			1
Archaic					
Early Archaic	3	3	7		13
Middle Archaic	2	3	1	1	7
Late Archaic	1	11	4	6	22
Formative					
Basketmaker III - Pueblo I		3			3
Pueblo III	24	19	115	4	162
Unknown Prehistoric	64	140	18	28	250
Protohistoric	2				2
Historic	4	4		1	9
Total	100	184	145	40	469

dence from the White Crack Area of the Island in the Sky.

Archaic Period

Temporally diagnostic artifacts and radiocarbon determinations provide evidence of Archaic use of the Needles District during all three Archaic subperiods, the Early, Middle, and the Late, although there was very little use of the area during the Middle Archaic (Table 9) period. Late Archaic occupation in the White Crack Area was common as evidenced by lithic scatters with hearths in the Island in the Sky District inventory area.

Although common on the Archaic sites, one-hand manos and slab-lined firepits are not restricted to the Archaic period and are also found on Formative period sites, so these traits cannot be used to assign a site to the Archaic period. Also, the most abundant dart-size projectile point noted during the inventories are large side- and corner-notched points generally classified as Elko points. Unfortunately, Elko points occur throughout the post-Paleoindian sequence up through Protohistoric times so these dart points cannot be used as temporal indicators. After the introduction of the bow and arrow, large side- and corner-notched bi-

facial implements were still being manufactured and used, not as dart points, but as hafted knives.

One of the research issues of the northern Southwest is the timing of the replacement of the atlatl with bow-and-arrow technology. According to Reed and Geib (2013), bow-and-arrow technology was introduced to the northern Southwest by AD 500 and perhaps as early as AD 100. The introduction of this technology is usually associated with the incipient agriculture and later, pottery manufacture. However, there is no evidence of incipient agriculture, early pottery, or the use of the bow and arrow in the Needles District until the arrival of the Pueblo III farmers.

As noted in Table 9, there are a large number of sites identified as unknown prehistoric sites. These sites do not exhibit evidence of surface structures or evidence of pottery or two-hand manos and trough metates, so they cannot be assigned to the Formative period. Nor do these sites contain temporally diagnostic projectile points. It is likely that most of these sites, particularly those around White Crack in the Island in the Sky, and in the Grabens and Lower Salt Creek areas of the Needles District are Archaic in age, but lack diagnostic

surface implements. Many of these sites contain hearth features that could be radiocarbon dated to resolve their temporal placement.

Archaic sites in the areas inventoried are almost exclusively open sites situated near, but not next to, rock knobs and outcrops. In the Needles District, many of these open lithic scatters are located on alluvial terraces. Although some small alcoves are associated with a few of these sites, stratified Archaic deposits are rare and restricted to the sites noted above. Larger alcoves in the Upper Salt Creek Area are dominated by large Anasazi cliff dwellings. These larger alcoves are generally lacking deep deposits, so it is unlikely that substantial Archaic occupations are present under the Formative structures in these sheltered sites.

Information about Archaic plant use can be assessed from the flotation analysis of bulk sediment samples noted above, with cheno-ams and grass seeds the most ubiquitous plants. The presence of ground stone and hearth features on Archaic sites supports the inference that cheno-ams and grass seeds were the staple food that was being ground and cooked by the Archaic foragers in both the Needles and Island in the Sky districts.

The presence of various large Archaic dart points and scrapers indicates that hunting was an important component of the Archaic subsistence in the inventory areas. One of the limitations of the inventory data is the lack of evidence of which animals were being utilized by Archaic hunters.

Early Archaic Period

The earliest evidence of Archaic occupation documented by the Canyonlands Archeological Project consists of six radiocarbon dates from the Upper Salt Creek Area. The two earliest radiocarbon dates are from sites 42SA17215 and 42SA21095. Dates from these two sites indicate the Early Archaic began around 8000 cal BC. Three other sites in the Upper Salt Creek Area (42SA17107, 42SA17790, and 42SA17216) also produced Early Archaic radiocarbon dates. These sites are open lithic scatters with hearths and several appear to be situated on a remnant of a late

Pleistocene terrace in the Upper Salt Creek Area.

These Early Archaic sites in Upper Salt Creek Area are represented by lithic and tool scatters and associated soil stains or unlined hearths. Three to four charcoal stains were noted on sites 42SA17107, 42SA17215, and 42SA17790. Two other Early Archaic sites, 42SA17216 and 42SA21095, each contained 9 and 12 soil stains respectively. These stains were probably thermal features resulting from multiple episodes of cooking meat or wild plant foods or fires for personal warming.

Notable artifacts from these dated Archaic sites in the Upper Salt Creek Area include an Elko side-notched point at site 42SA17216 and a Sand Dune side-notched from site 42SA17215. The association of the Sand Dune side-notched point with the radiocarbon dated feature on 42SA17215 at 7580–7075 cal BC confirms that this point type is correctly assigned to the Early Archaic period (Tipps and Hewitt 1989).

A Sand Dune side-notched point was also recovered from another Early Archaic site in the Upper Salt Creek Area, although no radiocarbon samples were collected from this site. A Sand Dune side-notched point was also noted in the Grabens Area at site 42SA18412 and one in the Lower Salt Creek Area at site 42SA17092. Another shallow side-notched point, smaller than other Sand Dune side-notched points observed during the inventories, was noted at an Anasazi alcove site, site 42SA17823, in the Upper Salt Creek Area.

Other evidence of the presence of Early Archaic people in the Needles District includes a Pinto projectile point at site 42SA18387 and a Northern Side-notched point at 42SA18365 in the Grabens Area. An Early Archaic stemmed point is reported from site 42SA20321 and a Pinto point is noted at site 42SA20252 in the Lower Salt Creek Area. One Pinto point was reported from site 42SA17768 in the Upper Salt Creek Area.

In summary, six radiocarbon dates from five sites, plus Sand Dune side-notched points, Northern Side-notched points, and Pinto points all docu-

ment the presence of Early Archaic hunter-gatherers in the Needles District.

Middle Archaic Period

The Middle Archaic Period generally corresponds to a long period of warmer summers and cooler winters. Human occupation on the entire northern Colorado Plateau was depressed at this time (Geib 2011) and this appears to be true for Canyonlands National Park as well. Only two features produced Middle Archaic dates. Both of these features were exposed below the modern ground surface in cut banks. One site in the Upper Salt Creek Area, 42SA17107, produced a radiocarbon date of 4945–4550 cal BC from charcoal in a cut bank. This feature occurred stratigraphically above the other dated Early Archaic feature at this site. The second Middle Archaic date of 4330–3965 cal BC was recovered from White Bird Shelter (42SA20615) in the Lower Salt Creek Area about a meter below the ground surface in an alcove. Neither of these dates was associated with diagnostic artifacts.

Several Middle Archaic point types were noted on lithic scatters in the Grabens Area and the Lower Salt Creek Area. These points include San Rafael side-notched points, a Rocker side-notched, and a Sudden side-notched point. No diagnostic Middle Archaic points were observed in the Upper Salt Creek Area. The limited data on Middle Archaic occupation in the inventoried areas is believed to be a result of limited human use of the Needles District during the Middle Archaic.

Late Archaic Period

The Late Archaic period is well represented in the White Crack Area in the Island in the Sky and the Needles districts with 5% of the components assigned to the Late Archaic period. As shown in Table 7, about 70% of the radiocarbon dates from the project fall within the Late Archaic period from Lower Salt Creek, the Grabens, and the White Crack Area in Island in the Sky. Most of these dated features are associated with surface lithic scatters and tool assemblages. There is no evidence that any of these sites were occupied or uti-

lized by farming groups noted elsewhere outside the park during this period.

Gypsum points, a distinctive Late Archaic dart point are common in the Grabens Area and Lower Salt Creek Area. Also common on some of these Late Archaic sites are large side- and corner-notched dart points that could be classified as Elko points, but they are not necessarily time sensitive.

The flotation analysis of the sampled Late Archaic features produced no evidence of corn, squash, or other agricultural crops. Also, none of the storage facilities, shallow pithouses, or diagnostic dart points that characterize the Basket-maker II period were found. Despite the presence of Early Agricultural communities east and south of Canyonlands National Park, the first evidence of corn in the Needles District comes from three corn samples (Appendix D) that have a pooled date of cal AD 990–1150, within the late Pueblo II period. In other words, after a relatively substantial Late Archaic presence in the Needles and Island in the Sky districts, the inventoried areas of Canyonlands National Park were basically uninhabited until Pueblo III times.

Besides diagnostic artifacts and radiocarbon dates, Late Archaic use of the Needles District is also demonstrated by the presence of Barrier Canyon style rock art. Both Sharrock (1966) and Hunt (1952) in her 1952 survey of the La Sal Mountains believed Barrier Canyon style “ghost figures” were made by the Fremont, along with shield-bearer rock art. Both authors relied on Morss’ (1931) association of these anthropomorphs and shield figures with the Fremont culture in central Utah.

Based on Schaafsma’s (1971) analysis, as well as contributions from the Canyonlands Archeological Project, the preponderance of the evidence indicates that the elongated triangular bodies of Barrier Canyon style anthropomorphs date to the Late Archaic (Tipps 1995). Several Barrier Canyon style anthropomorphs are present in the Needles District, although no panels are as spectacular as those in Horseshoe Canyon in the Maze District.

Formative Period

While the Canyonlands Archeological Project inventoried four areas of Canyonlands National Park, the Grabens, Lower Salt Creek Area, and the Upper Salt Creek Area, and the White Crack Area in the Island in the Sky District, evidence of the Formative period Mesa Verdeans was largely concentrated in the Upper Salt Creek Area. In this area, Pueblo III Mesa Verde Anasazi components represented 79% of the documented components. In the other inventory areas, only limited evidence of Pueblo farmers was noted. The Formative occupation in the park is discussed in greater detail below in the section on the archeology of Canyonlands National Park.

Protohistoric Period

Across the Mesa Verde region north of the San Juan River, the Protohistoric period starts after AD

1300 when the Formative period agriculturists emigrated southward. Sharrock (1966) identified one site (42SA1661) near Squaw Butte as a possible Protohistoric Navajo cribbed log hogan. This site was rerecorded in 1988 as two overlapping logs with branches lying on the ground in a semicircular plan. An Anasazi sherd and lithic scatter was also identified at the location. The logs are too small and too few to represent a cribbed log hogan or even a forked-pole hogan. No Dinetah Gray pottery was found at this site or elsewhere in Canyonlands National Park. Rather than a Navajo site, it seems more likely the logs and branches represent an early 20th century historic debris pile left on top of a prehistoric site or a lesser possibility, a brush structure created by Protohistoric Utes.

PART 2
SYNOPSIS OF THE ACHEOLOGY OF CANYON-
LANDS NATIONAL PARK

INTRODUCTION

The Canyonlands Archeological Project provided new insights into the prehistoric archeology of the park especially relating to the Archaic and Formative Pueblo III Mesa Verde occupations. The project demonstrated that prehistoric people have intermittently occupied or passed through the park for about 12,000 years.

When the results of the Canyonlands Archeological Project are added to other inventory projects in the park including the Maze District inventory (Lucius 1976), inventories by the Midwest Archeological Center in the Island in the Sky District (Osborn 1995), and an inventory by the NPS along the Green and Colorado rivers (Eininger 2008), what is most striking is the predominance of Early and Late Archaic sites in all three districts compared to the geographically and temporally limited distribution of Formative sites within the park. Although earlier inventories in Davis and Lavender canyons (Griffin 1984; Osborn et al. 1986) provided an incomplete record of Formative occupation in the park,⁷ the Canyonlands Archeo-

logical Project documented an extensive, well-dated Pueblo III Formative occupation in the upper reaches of Salt Creek in the park.

The three park administrative districts, the Maze, the Island in the Sky, and the Needles, have differential availability of permanent water, alluvium, variability in the presence of toolstone outcrops, and elevational gradients determining microenvironments affecting potential farming areas and the distribution of plants and animals. Variations in the availability of such natural resources and the different subsistence requirements of the Archaic foragers versus the Anasazi farmers (Ancestral Puebloan) resulted in differences in the archeological record of the three districts, especially noticeable in the presence or absence of Mesa Verdean farmers. Evidence for each of the major prehistoric time periods is summarized below, beginning with the oldest time period, the Paleoindian. Date ranges for each of these periods are presented in Table 3.

PALEOINDIAN AND ARCHAIC PERIODS

The evidence for the oldest period of human occupation in the park, the Paleoindian period, is limited to a few surface finds of Clovis points from the Maze and Needles districts and Late Paleoindian points from the Maze District. No Paleoindian campsites have been found within the park although Folsom campsites have been documented beyond the park (Byers 2012; Copeland and Fike 1988).

While evidence of Paleoindian use of the park is limited, Archaic period sites are abundant. This report documents Archaic sites in the Upper Salt Creek Area, additional Archaic sites have been reported from the Lower Salt Creek and Grabens areas (Tipps and Hewitt 1989; Tipps 1996), Island in the Sky (Tipps et al. 1996; Osborn 1995), and the Maze (Lucius 1976). The most common type of archeological site in all three districts is a lithic scatter; a surface scatter of flakes, broken tools, and debris from lithic reduction and tool manufacture. Most of these sites lack temporally diagnostic artifacts or features and thus can only be identified as prehistoric sites, although most are likely associated with Archaic period. However, some of these open sites can be associated with different periods of occupation during the Archaic period based on diagnostic dart points or radiocarbon determinations.

The inventory results in all three districts indicate that the most intensive Archaic use of the park occurred during the Early and Late Archaic periods, with a marked decrease in use during the Middle Archaic. The Middle Archaic coincides with a period of decreased summer precipitation and in-

creased aridity and dune formation. Evidence for Middle Archaic people in the park is limited compared to that of the Early and Late Archaic. This diminished archeological record is consistent with the evidence of a low population density across the entire Colorado Plateau during the Middle Archaic (Geib 2011:195–202; Tipps et al. 1996).

Long-term paleoclimatic shift towards aridity and seasonal droughts during the Middle Archaic would have affected the distribution and availability of seeds, which are one of the primary natural resources that attracted Archaic people to the park (Horn 1990; Osborn 1995). Flotation samples from the Canyonlands Archeological Project indicate the staples of Archaic subsistence were seeds of cheno-ams (*Chenopodium-Amaranthus*), dropseed (*Sporobolus* spp.), and Indian rice grass (*Achnatherum hymenoides*).

The mid-elevation benches in the park like North Flat and Ernie's County in the Maze and the White Rim in the Island in the Sky were evidently the locales favored for harvesting and cooking these edible seeds, as evidenced by the high number of lithic scatters with ground stone tools and hearths. However, it seems likely that some seeds were harvested and transported out of the park to residential camps established in nearby rock shelters or caves (e.g. Cowboy and Walters caves [Schroedl and Coulam 1994]; Old Man Cave [Geib and Davidson 1994]). The importance of grass seeds among Late Archaic people may be represented by the Late Archaic pictograph in the Maze District called the Harvest Scene, where an anthropomorph appears to have rice grass growing out of

its fingertip.

The presence of Archaic dart points on some of the lithic scatters demonstrates that hunting game animals was important to the Archaic economy. The Canyonlands Archeological Project indicates that the Archaic people in the park shared the same atlatl hunting technology and dart point styles found across the northern Colorado Plateau, from Glen Canyon and the Orange Cliffs to Navajo Mountain (Geib 1996, 2011; Jennings 1980; Jennings et al. 1980). Evidence of which game animals were hunted is limited because so few Archaic sites have been

excavated in the park, although big horn sheep, mule deer, and cottontail were common prey for Archaic groups in the region.

Cedar Mesa Chert is the most common toolstone used throughout the park during all prehistoric periods, as documented by Osborn (1995) on the Island in the Sky, the Maze District inventory (Lucius 1976), and the Canyonlands Archeological Project. While the availability of Cedar Mesa Chert may have attracted Archaic people to the park, they also came into the park to gather and process wild seeds and hunt game animals.

FORMATIVE OCCUPATION IN THE PARK

Visitors have been intrigued by the masonry ruins in the Salt Creek drainage since the 1950s when Kent Frost conducted commercial trips into what is now the park. These ruins were built by prehistoric farmers who arrived in the park during the Formative period.

Spectacular Formative sites with extensive ruins are known throughout the Southwest including Chaco Canyon and Mesa Verde. Southwestern archeologists define large Formative sites as having at least 50 contiguous rooms (Adler and Johnson 1996). By this definition, there are no true large Formative sites in Canyonlands National Park. Two of the largest masonry habitation sites in the park, Big Ruin (42SA1586) and Bighorn Sheep Ruin (42SA1563), only have 32 and 28 structures respectively (Metzger and Chandler 1986). While 50-room complexes are absent, smaller masonry habitation sites are present, as are multiple isolated granaries.

In the late 1950s and early 1960s, to promote the idea that the Canyonlands area would be a suitable addition to the national park system, Pierson (1962) asserted that the park encompassed an area where the Fremont and Anasazi Formative cultures came together. It is now known that his ideas about the Formative period occupation of the area were incorrect. Architectural styles and pottery on sites in the park indicate all of the granaries and masonry habitation sites were built during the Pueblo III period by Mesa Verde Anasazi. None of the structures were built by the Fremont nor was any of the

rock art created or influenced by Fremont people. The following sections summarize what is currently known of the Formative period in the park including the dominance of Anasazi occupation and the lack of any Fremont evidence.

Formative Chronology and Population

One of the differences between the archeological record of Canyonlands National Park and that beyond the park is the lack of a continuous sequence of Formative occupation. The Formative is defined as the conjunction of pottery, agriculture, and village life with several identifiable temporal subdivisions. As discussed above, the Formative period use of park is limited almost exclusively to the Pueblo III period.

Outside the park, there are numerous Basketmaker III sites in Montezuma Canyon (Montoya 2008). There are also small Pueblo I (AD 750–900) sites on the southern slopes of the Abajo Mountains, and a few substantial Pueblo I villages like Site 13 on Alkali Ridge. Throughout the region, there are several great houses, very large masonry habitation sites, that date between about AD 1050 through the early AD 1200s, for example, Edge of the Cedars Pueblo (42SA700) and the Comb Wash Great House (42SA24756) (Allison et al. 2012; Hurst and Till 2008).

However, evidence of these earlier periods is limited in the park. Researchers suggest that some pottery sherds along the Green River bottomlands indicate a minor amount of farming occurred in this area during the Pueblo II period (Hurst 2008; Lucius 1976).

Analysis of pottery (Appendix B) and radiocarbon dates (Appendix D) from the Needles District indicates that a community of Mesa Verde Anasazi farmers moved into the Upper Salt Creek Area after AD 1170. Based on a short duration of occupation and the number of living rooms recorded in the habitation sites, it was possible to calculate that the population of farmers in the Upper Salt Creek Area probably never numbered more than 73 people at any one time.

The Pueblo III Mesa Verde Anasazi who lived year-round in the largest masonry habitation sites or “home pueblos” in the Upper Salt Creek Area also intermittently utilized other areas of the park including the Lower Salt Creek Area and the bottomlands along the Green and Colorado rivers. In all three districts, the radiocarbon dates, architectural styles, pottery types, ephemeral middens, and lack of evidence of remodeled rooms indicate these people occupied and used Canyonlands National Park for a short period of time before they left the area by AD 1300.

Formative Climate and Farmers

Mesa Verde farmers did not move into the Upper Salt Creek Area of the park from surrounding areas until the climate ameliorated after one of the worst megadroughts of prehistory—that from about AD 1067–1160 (Roustan et al. 2011; Van West and Dean 2000). After this megadrought, conditions must have been adequate for dry-land farming because there is no evidence of prehistoric irrigation systems within the inventoried areas. The Pueblo III farmers who left behind small masonry habitation sites and granaries in all three park districts were successful dry-land farmers.

The climate required for successful dry-land corn farming is an annual precipitation of ~30 cm and 120 frost-free days (Benson et al. 2003, 2013). Modern climatic data, edaphic, and topographic data can illustrate why dry-land farming in most areas of the park was not feasible. For example, the weather station at Canyonlands, the Needle (altitude 1537 m, 5043 feet) shows an average annual

precipitation of 22 cm and 90% probability that 114 consecutive days are frost-free—insufficient for successful annual corn production.

Figure 22 is an isopleth map depicting areas of the park where dry-land farming may have been possible under good climatic conditions (based on modern data). The map depicts an isopleth of a minimum of 25 cm annual precipitation (probably less than necessary for prehistoric dry-land farming). The map also depicts elevations greater than 2130 m. While higher elevations in the area may receive more than adequate annual precipitation, these higher elevations do not have sufficient frost-free days for corn to mature. The areas between the 25 cm precipitation isopleth and the 2130 m contour line represent the potential areas for dry-land farming of corn within the park and surrounding areas. Of course, the climate has fluctuated over time, expanding and contracting the area that could have been successfully farmed, but the map indicates how limited the area within Canyonlands National Park would have been for dry-land farming, all of it near the southeast corner of the park where the major Pueblo III occupation has been identified.

Soil is another factor limiting farming in the park. When soil maps are overlain with the climate isopleth map, the only localities with the right conditions for dry-land farming are restricted to the southeast corner of the park, and bottomlands along the Green and Colorado rivers. With marginal soils, limited areas with the right balance between precipitation and frost-free days, dry-land farming of corn was not feasible over most of the park under historic conditions.

During at least some seasons during the thirteenth century, local conditions may have been suitable for growing cotton in the Salt Creek drainage. Hopi cotton (*Gossypium hopi*) needs a warm but short growing season, ripening in 84 to 100 days after the sowing of the seed (Kent 1957:465; Lewton 1912). Cotton bolls have been found at Paul Bunyan’s Potty (42SA80) and cotton cordage, fibers, and cloth have been found at Big

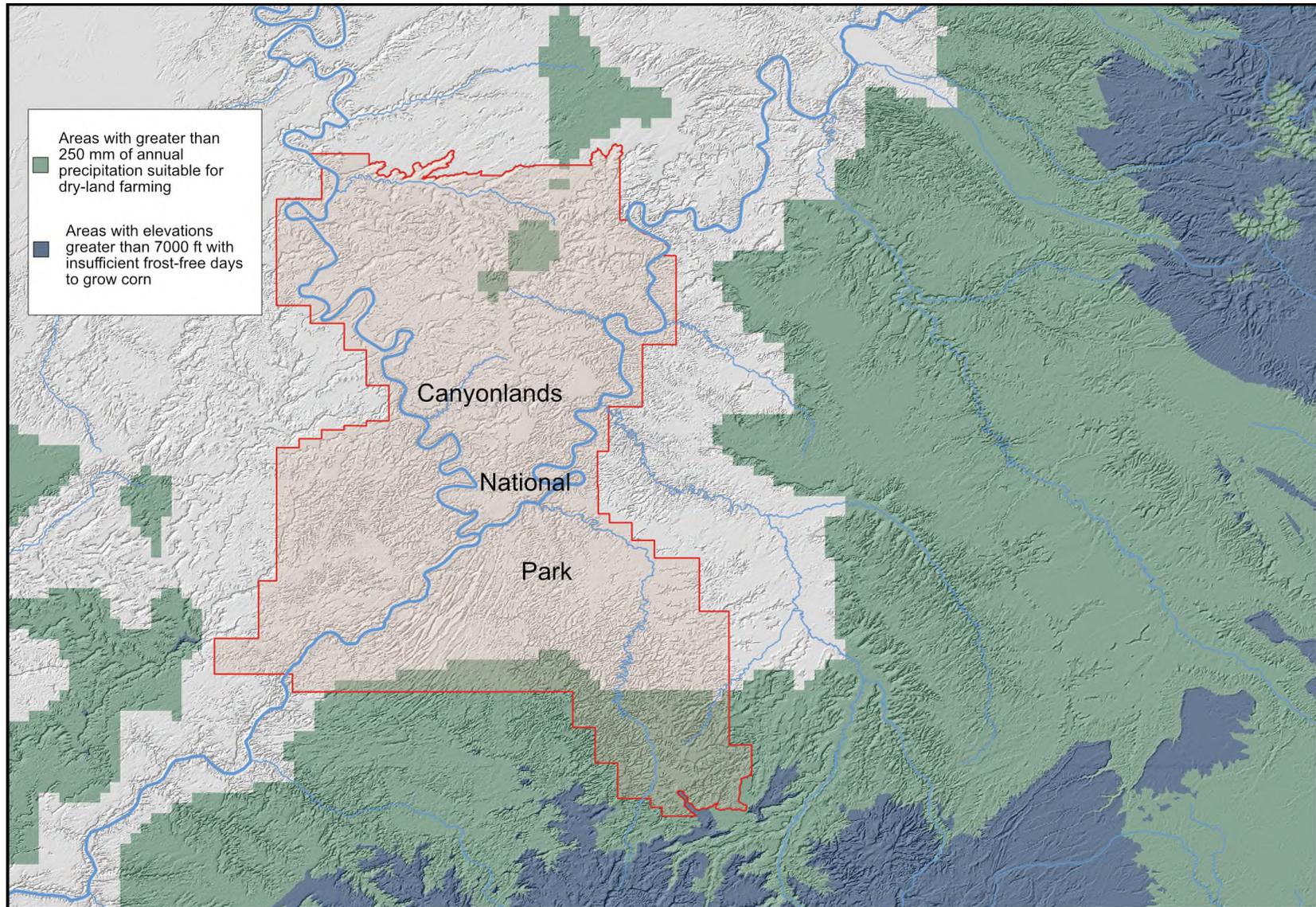


Figure 22. Map depicting limited areas suitable for prehistoric farming in Canyonlands National Park and surrounding areas based on elevation and modern precipitation data.

Ruin (42SA1586) and Bighorn Sheep Ruin (42SA1563). The latter site had loom anchors in the floor of a kiva (Metzger and Chandler 1986), indicative of on-site cloth production. Spindle whorls have been found at four sites in the Upper Salt Creek Area (42SA1586, 42SA17783, 42SA21117, 42SA21121). If cotton was grown in the Upper Salt Creek Area and not just imported, this would have been one of the farthest north locales where prehistoric cotton was farmed.

Canyonlands National Park was depopulated by AD 1300—the same time the entire Mesa Verde region was depopulated. Archeologists once thought the “Great Drought” of AD 1275–1300 caused the Mesa Verde people to abandon the region, but this drought was not as severe as that of the mid-1100s. While precipitation was reduced during the Great Drought, temperatures were also cooler than normal resulting in more killing frosts that reduced crop yields. It now appears that these paleoclimatic factors combined with widespread violence may have been what led people to emigrate from the park and the region (Kohler et al. 2014; Matson et al. 2015; Van West and Dean 2000).

Formative Period Pottery

While Sharrock (1966:63) found that the occupation of the Needles District was restricted to the Mesa Verde branch of the Anasazi, he thought the occupation dated to Pueblo II, specifically to AD 1075–1150 based on misidentification of temporally diagnostic pottery types (Sharrock 1966: Table 4).⁸ Based on a reanalysis of Sharrock’s curated sherds (Appendix B), Pueblo II types (Mancos Corrugated and Mancos Black-on-white) are extremely rare.

Across the three districts of the park, most of the pottery comes from the Needles District where almost 3700 pottery sherds have been documented from the 1966 field collections, pottery sherds identified on site forms by the Canyonlands Archeological Project, collections of the stabilization project sherds by Nickens and Associates, analysis

of the pottery collection at the Needles Visitor Center, and Hurst’s (2008) analysis from sites on the east bank of the Colorado river corridor survey. In Appendix B, Lucius shows that 99% of all pottery sherds identified in the Needles District are Mesa Verde wares, and 88% of these pottery types date to Pueblo III, predominated by Mesa Verde Black-on-white and McElmo/Mesa Verde Black-on-white types.

Hurst (2008) noted that Pueblo III pottery was predominant in the river corridors, with some sites exhibiting earlier Pueblo II and Fremont sherds along the Green River. A few Kayenta Anasazi sherds were also found along the river bottoms. On the top of the Island in the Sky, Mesa Verde pottery was predominant in the few sites with pottery (Osborn 1995). There were also a few Kayenta Anasazi sherds and a few Protohistoric Numic sherds discovered in this district.

In the Maze, Lucius (1976) found a predominance of Pueblo III Mesa Verdean pottery, with a few earlier Mesa Verde types that date to Pueblo II, AD 880–1100 (Cortez Black-on-white and Deadmans Black-on-red). There were a few sites in the Maze that had Fremont sherds that are not temporally diagnostic. Any Pueblo II Mesa Verdean pottery in the park appears to have been imported from south and east of the Abajo Mountains, while the Fremont pottery was imported from further to the west.

A conclusion drawn from the distribution of pottery types across Canyonlands National Park is that neither the Colorado River nor the Green River mark the western boundary of the Mesa Verde Anasazi pottery tradition. Mesa Verde Anasazi gray and white wares predominate wherever pottery is found in in the park, including along the bottomlands of the Green River in the Maze District and even on a few sites in the uplands of the Maze District (Lucius 1976). The scarcity of Fremont pottery in the Maze District led Lucius (1976:94) to conclude that the main frontier or interaction zone between the Fremont and the Mesa Verde Anasazi was not in the park, but might be

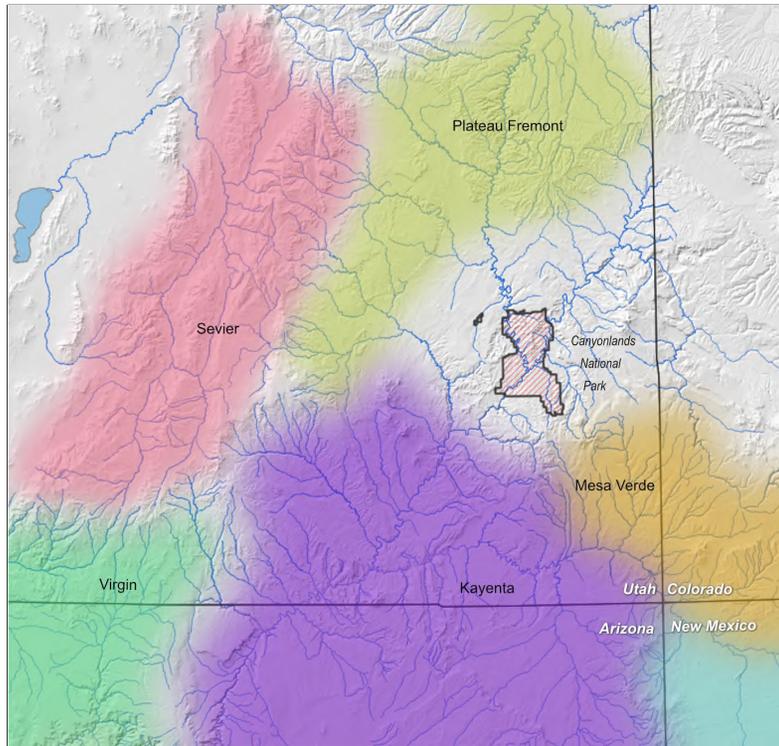


Figure 23a. Geographic distribution of various cultural traditions in the Southwest pre-AD 1150 in relation to Canyonlands National Park.

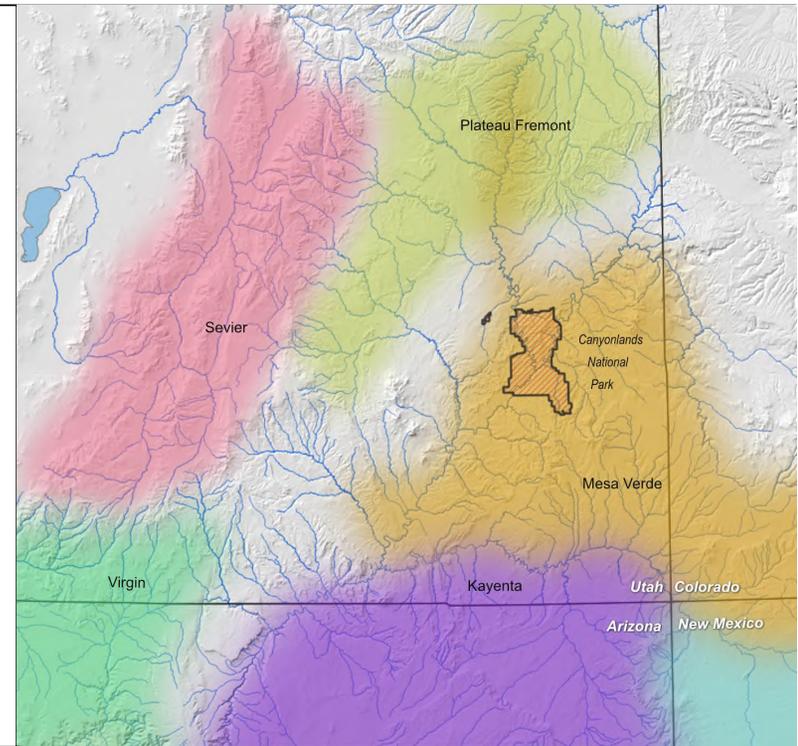


Figure 23b. Geographic distribution of various cultural traditions in the Southwest from AD 1150–1300 in relation to Canyonlands National Park.

somewhere further to the west, perhaps beyond the Henry Mountains or the San Rafael Swell (Figures 23 a and b).

The site forms from the Canyonlands Archeological Project sometimes mention that the white wares were made with a dark paste, a characteristic of Pueblo III pottery distributed across the western portion of the Mesa Verde region (Geib 1996:186–188; Glowacki et al. 2015; Hurst 2008; Lipe 1967; Severance 2015). Temper in the few dark paste sherds from the park that have been microscopically analyzed appears to be crushed potsherd mixed with crushed andesite/diorite porphyry or sometimes sand or sandstone (Hurst 2008; Lucius 1989:105–106). Because sand or sandstone temper is also diagnostic of Kayenta pottery, it is possible some of the sherds reported by the Canyonlands Archeological Project field crews that are attributed to the Kayenta Anasazi branch might be mistyped Mesa Verdean wares. The field crews also noted on site forms that a few sherds had dark igneous rock temper like that in Fremont gray wares, but the sherds were not microscopically examined. As Geib and Lyneis (1996) concluded, more petrographic work on sherds across southern Utah is necessary to understand the sources and distribution and interpretations of igneous-rock tempered pottery vessels.

Compositional analyses of pottery from Canyonlands National Park have yet to be conducted. However, compositional analysis of gray and white wares from sites located south of the park and north of the San Juan River (Glowacki et al. 2015) indicates the dark-firing paste used by Pueblo III Mesa Verde potters to make white wares came from the Chinle or Kayenta formations. The clays from these formations used to make these vessels appear to have originated from west of Comb Ridge or possibly in the Beef Basin-Elk Ridge uplift areas (Hurst 1995:67, 2008). The white wares appear to have been imported into the park from these sources. (See Appendix B).

Wherever the specific source or sources, during the Pueblo III period, dark paste white ware ves-

sels were widely distributed across the region from the Needles District to the Red Rock Plateau and Glen Canyon. The predominance of the dark paste Mesa Verde Black-on-white and McElmo/Mesa Verde Black-on-white vessels in park and the absence of other types and varieties indicates that people in Canyonlands National Park were primarily interacting and exchanging pottery with other western Mesa Verdean communities during the Pueblo III period.

Red wares are extremely rare in Canyonlands National Park (Appendix B). This is not because they have been collected by visitors—rather, at the time of the predominate Pueblo III occupation of the park, red wares were not being made in the Mesa Verde region—the locus of production had shifted to the Kayenta region (Lucius 2020). It appears that people living in Canyonlands National Park during Pueblo III had little interaction with the Kayenta region to the south.

The assemblage of pottery within the park demonstrates the area was occupied by Mesa Verde Anasazi and that any Kayenta or Fremont pottery in the Maze or the Green River corridor was the result of trade or interaction. These data dispel the idea that either the Green or the Colorado rivers formed the boundary or interaction zone between these Formative peoples. It seems that Canyonlands National Park is not the place that provides evidence of the meeting grounds between the Mesa Verde Anasazi and the Fremont as expected by Pierson (1962).

Formative Period: Canyon Settlements and Architectural Types

The settlement patterns in the park reflect broad patterns and trends observed across the Mesa Verde region during Pueblo III (Geib 1996; Lipe 1967; Lipe and Varien 1999; Smith 1987). During the Pueblo III period, population from Mesa Verde National Park to Cedar Mesa and Grand Gulch shifted in two ways: 1) into large, aggregated communities or villages with over 50 rooms like Yellow Jacket Pueblo or Sand Canyon Pueblo, and 2)

into lower elevation canyons and drainages that had not been previously occupied, like Cow Canyon in Glen Canyon and the Salt Creek drainage in the park.

Tree-ring dates across the Mesa Verde region indicate the movement of people into canyons and the construction of cliff dwellings started in the late AD 1100s with construction peaking between AD 1240–1270. The region was basically abandoned by AD 1290 or 1300 (Ahlstrom 1997; Bedell 2000; Lipe and Varien 1999; Matson et al. 2015). While tree-ring dates are not currently available from the park (Appendix J), the density of the largest masonry habitation sites and fieldhouses in the Upper Salt Creek Area of the Needles District reflects this regionwide pattern of people living and farming in lower elevation canyons from AD 1200–1300.

The densest concentration of Formative sites in Canyonlands National Park is in the Upper Salt Creek Area. Ten of the 16 masonry habitation sites in this area are sheltered under an alcove or overhang; i.e., these are cliff-dwellings like those on Mesa Verde, but much smaller, housing a smaller population. Walls of these sheltered habitation sites were mostly built using single stone wall construction with unshaped sandstone slabs. There are no carefully shaped and pecked McElmo style blocks of the earlier Pueblo II period anywhere in the park.

In Mesa Verde National Park, this Pueblo III style of building with unshaped blocks is believed to have developed because the sheltered locations did not demand the regularity and strength that more open and exposed mesa top locations required (Hayes 1964; Smith 1987:65). The frequent use of alcoves and overhangs may also account for the simple construction techniques observed in Formative period sites in the park.

Unlike the large aggregated villages located in the central and eastern parts of the Mesa Verde region, there was never a large Formative population living in the Needles District. At any one time the momentary population estimate is that a maximum

of 73 people lived in the Upper Salt Creek Area. This calculation is based on the 16 habitation sites in the Upper Salt Creek Area which had a total of 119 living rooms and an average of 7.4 living rooms per site.

However, this population density is greater than those in the canyons of the Colorado and San Juan rivers in Glen Canyon National Recreation Area. For example, Geib and Fairley (1996) describe a Pueblo III/Horsefly Hollow phase community in Cow Canyon (a tributary of the Escalante River) with six open habitation sites where the two largest sites contained only two to three living rooms. These are similar to the one-to-two room masonry sites in the Upper Salt Creek Area that were classified as fieldhouses rather than permanent habitation sites. In other words, while the masonry habitation sites in the Needles District of the park are small by the standards of eastern and central Mesa Verde villages, they are larger and more permanent than those in the tributaries of Glen Canyon.

In addition to cliff-dwellings, open habitation sites, and fieldhouses, there are two other Formative period site types in the park. The rarest type of site in all of Canyonlands National Park is an apparent great kiva (42SA1627) in the Needles District. This large circular depression has a 12–21 m (40–70 ft) diameter (which is large enough to be classified as a great kiva), making it the furthest known north and west great kiva site in the Mesa Verde region.

Two tower ruins are reported in Canyonlands National Park. Towers (defined as masonry structures taller than they are wide) are a relatively common type of Pueblo III architectural feature in the Mesa Verde region with at least 40 of them documented in southeast Utah (Bredthauer 2010).

Towers in the park include Fort Bottom Ruin (42SA78) in the Island in the Sky District and Tower Ruin (42SA1470) in the Needles District. Wood in these structures date to 790 ± 60 BP, cal AD 1045–1385; and 760 ± 60 BP, cal AD 1160–1390; respectively, showing that these towers in the park were constructed during the Pueblo

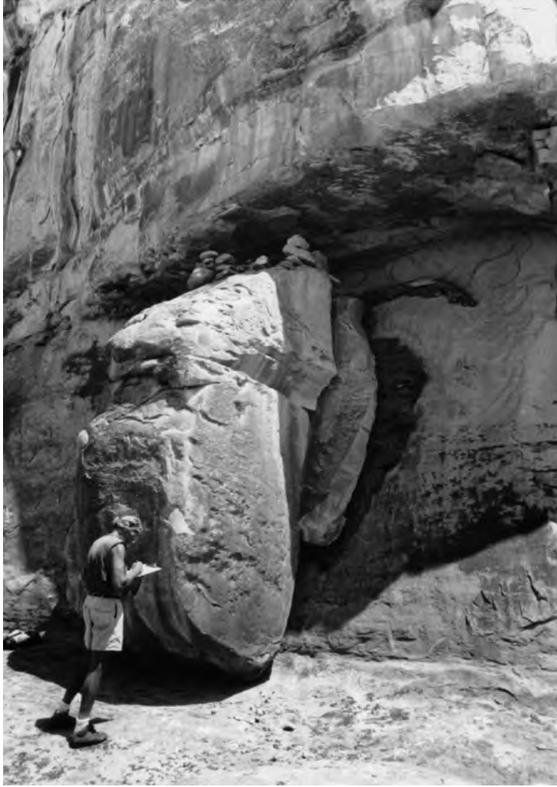


Figure 24. Granary on a large boulder at fieldhouse site 42SA1596.

III period (Appendix D). Van Dyke and King (2010) have suggested that Pueblo III Mesa Verde towers are a form of public architecture designed to mimic earlier Chacoan monumental buildings, but archeologists do not know what towers symbolized or why they were built.

Storage facilities are one of the most common types of architecture in all three districts of the park (Figure 24). While storage features and cists are common in the habitation sites and fieldhouses, many masonry granaries are located far from the nearest habitation site and are sometimes located on nearly inaccessible ledges or high on cliffs.

It has been suggested that these remote inaccessible granaries represent storage locales away from habitation sites to protect stored crops from human marauders (Figure 25). However, the apparent defensive nature of the granary locations may not have been to discourage humans; instead, the loca-



Figure 25. Granary on ledge at limited activity site 42SA21123. A crew member is recording the granary (circled).

tions may have been selected to avoid animal pests. Isolated storage locales near fields away from habitation sites cannot be easily monitored for pests and predators, so choosing a relatively inaccessible location combined with a sturdy construction technique would have served as a deterrent for non-human pests.

Also, establishing storage facilities for next season's seed corn close to distant fields eliminates the need to transport seed corn back to the habitation site for winter storage only to then have to transport it back to the fields next year. The function of these isolated granaries may have been to dry and store seed corn next to fields that were located at a distance from the "home pueblos" in Upper Salt Creek.

Because of the marginal farm land in the park, it is hypothesized that at least some of the isolated granaries in the Maze and Island in the Sky dis-

districts are associated with fields planted in localities distant from habitation sites. These fields were situated in different microzones to maximize the probability of a successful crop in the event of crop failure near the home pueblos.

It may be that such distant fields were planted and left unattended with hopes that some of these fields might produce crops to augment poor production or crop shortages near permanent residences and more frequently farmed fields. The assemblage of corn cobs with differing row numbers indicates a concern with risk management—the farmers were apparently selecting multiple varieties of corn to diversify production and help ensure sufficient crops.

Despite environmental limitations, during the Pueblo III period, people were able to farm and even create surpluses for storage as evidenced by the number of granaries and storage cists. It is also possible that the relatively large number of granaries and storage cists in the park might reflect the construction pattern documented by Dean (2006) at Kiet Siel in the Kayenta region to the southwest. The additional storage features at these site may not reflect excess surpluses but rather a need to mitigate against potential crop shortages in the future. Dean (2006) found that in the mid-AD 1200s, paleoenvironmental conditions for corn agriculture worsened and households increased the number of storage facilities while reducing the amount of living room space.

Such a storage strategy would ensure having enough seed corn to replant fields after a year of losses and also to maintain an adequate food supply until the next productive farming season. Spielmann and others (2011) identified this practice of increasing storage as a strategy of Pueblo farmers to address the problem of environmental fluctuation and reduction in annual precipitation and uncertainty of crop yield.

Formative Period: The Fremont-Anasazi Frontier

Pierson's (1959, 1962) argument for establish-

ing Canyonlands as a park was that it could provide scientific evidence for contact between two branches of Pueblo culture—the Mesa Verde Anasazi and the Fremont. Based on sites documented since the park was established in 1965, Canyonlands National Park is part of the Mesa Verde Anasazi tradition. There is no evidence of a contact zone between Fremont and Mesa Verde Anasazi within the park nor is there any evidence of Fremont habitation sites in any of the districts.

The limited evidence of Fremont in the park is restricted to a handful of pottery sherds from the Maze and the Green River corridor (Hogan et al. 1975; Hurst 2008; Losee and Lucius 1975). These sherds likely resulted from trade. In contrast, dozens of Mesa Verde Anasazi habitation sites have been documented associated with thousands of Mesa Verde Anasazi sherds in almost all areas of the park.

Several researchers have cited various rock art panels and the presence of a few pinched-nose figurines from the region as evidence of Fremont presence in the park and areas south of the Colorado River (Chandler 1990:103; Eckersley 2018; Neal 2010:106; Warner 1983). The two pinched nose figurines that have been reported from Beef Basin and Big Horn Sheep Ruin, and ascribed to the Fremont, are examples of common Formative figurine manufacture throughout the region. These are not the elaborate clay figurines that Wormington (1955) identified as a diagnostic Fremont cultural trait.

Recognizing the predominate Anasazi occupation in the region, Sharrock (1966) believed that the rock art in the park was a result of the borrowing of Fremont rock art styles by the Mesa Verde Anasazi. For example, Sharrock (1966) wrote that horned anthropomorphs, shield-figures, and ghost figures represented the influence of Fremont motifs. However, ghost figures are not Fremont in origin. Schaafsma (1971) and the Canyonlands Archeological Project (Tipps 1995) demonstrated that Sharrock's ghost figures, known today as Barrier Canyon style, date to the Late Archaic—not



Figure 26. “Holy Ghost” pictograph in Barrier Canyon in the Maze District, site 42WN418.

the Fremont or Formative period (Figure 26).

Rock art depicting other horned anthropomorphs with trapezoidal bodies, bucket-shaped heads, ear bobs, and limbs are not solely limited to the Fremont region. Horned anthropomorphs are present in Canyonlands National Park and elsewhere in the Greater Southwest (Geib 2016:328; Kolber 2000; Malotki 2007). Detailed morphometric and comparative work in the Greater Southwest is necessary to determine if there are different types of horned anthropomorphs that can be associated with particular cultures or time periods.

Sharrock (1966) also thought shield-bearers including the All-American Man (42SA1614) (Figure 27) represented Fremont influence. This was because a decade earlier, Wormington (1955) reported shield figures as a diagnostic Fremont trait based on the assumption that the Pectol shields were Fremont because they were found near other Fremont sites (Morss 1931).

In fact, the Pectol shields from central Utah were radiocarbon dated to the Protohistoric period and the NPS has repatriated them to the Navajo. Pigment from the All-American Man shield-bearer in the Needles District has been directly dated to



Figure 27. All American Man (42SA1614), a 13th century Anasazi shield-bearer pictograph from Upper Salt Creek Area.

the end of the 13th century (Chafee et al. 1994), contemporaneous with the Pueblo III Mesa Verdean occupation in the area.

There are many Anasazi depictions of shield-bearers and shields in the Needles District and elsewhere in the Southwest. Shield depictions are prevalent in the rock art of Pueblo III sites in Cow Canyon and the famous Defiance House in Glen Canyon (Geib and Fairly 1996:192).

There is an actual Anasazi shield interred with a man who apparently died by a blow to his head at Aztec West (Morris 1924:192–195). Shields are not diagnostic nor restricted to the Fremont culture, they occur from Canada to Mexico and are

not culturally nor temporally diagnostic (Loendorf 2001, 2004; Rogers 2003).

Finally, the Face Motif rock art style has been attributed to the Fremont (Figure 28). Appendix H discusses the motif and compares it to elaborate Fremont figurines. Such representations of the human form are common among all Ancestral Puebloans and do not represent directional influence from either Fremont to Anasazi or Anasazi to Fremont.

In conclusion, aside from a few Fremont sherds found along the Green River and the Maze District, there is no material culture evidence for the Fremont in the park. Neither locally manufactured



Figure 28. Example of the Canyonlands Anasazi Faces Motif rock art style; Four Faces (42SA1629).

pinched nose clay figurines nor the locally created Canyonlands rock art style provide any evidence of Fremont presence, borrowing, or influence in and around Canyonlands National Park or Beef Basin. The area south of the Colorado River was

exclusively occupied by Formative Mesa Verde Anasazi farmers (Ancestral Puebloans) who created their own mobiliary and parietal art without influence from Fremont neighbors to the north.

PROTOHISTORIC PERIOD

There is little evidence in Canyonlands National Park for the Protohistoric, post-AD 1300 peoples including Numic-speaking Utes, Southern Paiutes, or Navajo. Reed (1993) reported that the surface component at Shadow Shelter (42SA8477) in the Needles District represents a Numic occupation. Sharrock (1966) identified a scatter of wood logs as a Navajo hogan, but this identification is questionable. On top of the Island in the Sky, a few Protohistoric Numic sherds were found (Osborn 1995). One metal projectile point has been recovered near Aztec Butte.

In the Needles and Maze districts, a few Protohistoric arrow points have been documented on sites. Noxon and Marcus (1985:91) reported several petroglyphs depicting horseback riders which could be from the Protohistoric period or these im-

ages might represent historic cowboy rock art.

The most well-documented evidence of Protohistoric peoples in the park is a salt cache stored in Hopi Yellow Ware vessels in the Needles District (Kinnear-Ferris 2011; Kinnear-Ferris et al. 2015; Pierson 1981:79). Organic matter from this cache dates to the late AD 1600s–1700s. In addition to this cache, several Hopi Yellow Ware sherds were brought to the Needles District Visitor Center. Archeologists working in southeastern Utah including Hunt (1953) and Pierson (1981:79) believed this Hopi pottery represents trade ware left behind by Protohistoric Numa or possibly Athapaskans rather than actual Hopi migrations or visits this far from the Hopi Mesas.

FINAL SUMMARY

The archeological record of Canyonlands National Park indicates that the park was not continuously occupied. The most intensive use of the park occurred during three prehistoric time periods: The Early and Late Archaic periods and Pueblo III period of the Mesa Verde Anasazi sequence. The Late Archaic people created the Barrier Canyon Style of anthropomorphic rock art found in the Horseshoe Canyon Detached Unit and throughout the park.

Mesa Verde Anasazi did not arrive in the park until after AD 1170, most likely coming from the Beef Basin and Abajo Mountain uplands. The timing of this arrival seems to correspond with amelioration of the climate and is consistent with a regional shift to canyon bottom settlements and cliff-dwellings. The people who moved into the park after AD 1170 were dry-land farmers who were apparently successful in raising crops of corn and squash and maybe cotton, at least some years. By AD 1300, the farmers abandoned the canyon county, probably moving south to join the large Pueblo IV villages that formed in northern New Mexico and Arizona.

Between AD 1300 and the AD 1600s, there were about 300 years during which the park does not appear to have been consistently visited. Around AD 1600, there is some evidence that ancestors of the Numic-speaking Southern Paiute or Ute or possibly the Navajo came into the park to obtain natural resources like salt. There is also a very minor amount of Numic pottery and projectile points elsewhere in the park that represent Proto-historic use.

The people who came into the park during the Archaic shared in the same technology and styles as other Archaic hunter-gatherers from Glen Canyon to Navajo Mountain. The Formative occupants of the park belonged to the greater Mesa Verde Anasazi tradition found north of the San Juan River. These dry-land farmers constructed masonry habitation sites in the Needles District and granaries elsewhere in the park after about AD 1170. Some of the rock art created by the Mesa Verde farmers is unique to the Canyonlands area, but by and large, as remarked by Pierson (1962), the Formative sites in the park are typical of the Four Corners region. These farmers shared their pottery tradition with other Mesa Verdeans living within the Mesa Verde region. The timing of their immigration to the park and emigration out of the park by AD 1300 correlates with major paleoclimatic shifts that affected others across the northern Southwest.

In conclusion, the current knowledge of the archeology of the park reinforces what Pierson (1959, 1962) wrote 60 years ago; namely, that the prehistoric people of Canyonlands National Park are not unique, but first share in the Archaic traditions of the Greater Southwest and later the Mesa Verde Formative traditions of the Ancestral Puebloans. Pierson noted that the archeology of Canyonlands National Park is unprecedented in its remote setting, its unspoiled landscape, and the sense of discovery that visitors and archeologists alike share when exploring the park.

NOTES

1. Schmieding (2008:215) incorrectly cites P-III Associates as “P-III Archeological Contractors” in the 2008 administrative history of Canyonlands National Park. Schmieding (2008:215) also misrepresents P-III Associates as the excavators of the Downwash site (42WN1666) in the Maze District. P-III Associates conducted the initial testing of the site (Brown 1987). The site, however, was later excavated and analyzed by Alpine Archaeological Consultants, Inc. under a separate contract. The final excavation report on the Downwash site was prepared by Horn (1990).

2. All site recording, site plotting, photo documentation, sampling, and reporting on this project were conducted by P-III Associates personnel exclusively. Schmieding (2008:273, end note 108) incorrectly reports that P-III Associates analyzed 9000+ artifacts at the Western Archaeology and Conservation Center. P-III Associates staff did not travel to Tucson, Arizona, nor did the staff analyze 9000+ curated artifacts there under contract CX 1200-4-A063.

3. Sharrock (1966: Table 4) documented more than 1000 sherds, but in 1985, only 482 sherds were available for reanalysis. These were reassessed and reassigned as identified in Appendix B.

4. In the early 1960s, Sharrock worked on the Upper Colorado River Basin Archeological Salvage Project (UCRBASP), better known as the Glen Canyon Project. In 1965–1966, Sharrock and

his team followed the survey procedures of the Glen Canyon Project in their survey of Canyonlands National Park. Schroedl (1982:88) notes that many sites were missed on the Glen Canyon project as well.

“It is now clear that the primary orientation of the survey crews of the Glen Canyon Project was towards large Pueblo habitation sites in alcoves on the mainstem and side canyons of Glen Canyon. This partially explains why many of the previously unrecorded sites discovered by NPS archaeologists in the late 1970s are on alluvial terraces, knolls and points. These areas were not intensively surveyed by UCRBASP archaeologists who concentrated their efforts on canyons and tributaries rather than the uplands, since the uplands would not be directly impacted by Lake Powell. During the period of the UCRBASP apparently most archaeologists still saw scatters of pot sherds and lithic artifacts as relatively uninformative and sought more substantial information from large occupation sites” Schroedl (1982:88).

5. Grab samples were obtained from a few of the sites. Artifacts collected include some diagnostic projectile points, some sherds for temper analysis, a few flakes of exotic material types including obsidian for analysis, and a few other rare specimens. All artifacts encountered from feature samples that were sampled for radiocarbon dating and

flotation analysis were also collected.

6. In 1986, all of Big Pocket was inventoried and inspected, in most cases to at least the 6200-ft (1890 m) contour interval including higher accessible alcoves and ledges. A few visible sites on the west side of Salt Creek were recorded but this area was not intensively inventoried.

The 1989 inventory was conducted in two separate areas, the first, on the east bank of Salt Creek below Big Pocket and adjacent to the area inventoried in 1986. The second area, also adjacent to the 1986 inventory, was above Big Pocket and encompassed both sides of Salt Creek. In general, the inventory in these areas was conducted up to the base of the surrounding cliffs although in some areas higher ledges that could be reached from the canyon bottom were inventoried. Intermountain Antiquities Computer System (IMACS) site forms with legal locations and detailed site descriptions for each of the sites were provided to the NPS.

7. Inventories in Lavender and Davis canyons, conducted by the Midwest Archeological Center,

assigned sites to earlier Pueblo periods (Griffin 1984; Osborn et al. 1986), but the pottery identifications are questionable. During the Canyonlands Archeological Project, Adrienne Anderson, NPS Regional Archeologist, proposed sending a crew to Lavender and Davis canyons to reassess the pottery identifications, but the funding never materialized. Until further verification of the pottery types in these canyons is completed, the Anasazi components at these sites are presumed to be Pueblo III.

8. Severance (2015) reports that Mancos Corrugated may be found in association with Dolores and Mesa Verde corrugated, Pueblo III types, in the western portion of the Mesa Verde region. Tipps and Hewitt (1989) report Pueblo sites in Devils Lane and Salt Pocket areas. Field crews were being conservative at the time by assigning untypeable corrugated body sherds to Pueblo II–III periods. As discussed in this report, these sites most likely date to Pueblo III and are noted as such in Table 9.

REFERENCES

- Adams, E. Charles
2013 Relationships among Design, Time, Source, and Glyphs on Prehispanic Jeddito Yellow Ware. *Kiva* 79:125–146.
- Adams, E. Charles, Miriam T. Stark, and Deborah S. Dosh
1993 Ceramic Distribution and Exchange: Jeddito Yellow Ware and Implications for Social Complexity. *Journal of Field Archaeology* 20:3–21.
- Adler, Michael A.
1992 The Upland Survey. In *The Sand Canyon Archaeological Project: A Progress Report*, edited by William A. Lipe, pp. 11–23. Occasional Paper No. 2. Crow Canyon Archaeological Center, Cortez, Colorado.
- Adler, Michael A., and Amber Johnson
1996 Mapping the Puebloan Southwest. In *The Prehistoric Pueblo World, A.D. 1150–1350*, edited by Michael A. Adler, pp. 255–272. University of Arizona Press, Tucson.
- Adler, Michael A., and Richard Wilshusen
1990 Large Scale Integrative Facilities in Tribal Societies: Cross-cultural and Southwestern U.S. Examples. *World Archaeology* 22(2):133–146.
- Agenbroad, Larry D.
1986 *Phase II Report. Quaternary Studies: Glen Canyon National Recreation Area & Canyonlands National Park*. Department of Geology, Northern Arizona University, Flagstaff. Submitted to Rocky Mountain Regional Office, National Park Service, Denver.
- Agenbroad, Larry D., and Jim I. Mead
1992 *Quaternary Paleoenvironmental Studies of the Colorado Plateau Year IV*. Quaternary Studies Program/Department of Geology, Northern Arizona University, Flagstaff. Submitted to Rocky Mountain Regional Office, National Park Service, Denver.
- Ahlstrom, Richard V. N.
1997 Sources of Variation in the Southwestern Tree-Ring Record. *Kiva* 62:321–348.
- Allison, James R., Winston B. Hurst, Jonathan D. Till, and Donald C. Irwin
2012 Meanwhile, in the West: Early Pueblo Communities in Southeastern Utah. In *Crucible of Pueblos: The Early Pueblo Period in the Northern Southwest*, edited by Richard H. Wilshusen, Gregson Schachner, and James R. Allison, pp. 35–52. Cotsen Institute of Archaeology, University of California, Los Angeles.

- Ambler, J. Richard, and Mark Q. Sutton
 1989 The Anasazi Abandonment of the San Juan Drainage and the Numic Expansion. *North American Archaeologist* 10(1):39–53.
- Baker, A. A.
 1933 *Geology and Oil Possibilities of the Moab District, Grand and San Juan Counties Utah*. Geological Survey Bulletin No. 841.
- Bannister, Bryant, Jeffrey S. Dean, and William J. Robinson
 1969 *Tree-ring Dates from Utah S-W, Southern Utah Area*. Laboratory of Tree-Ring Research, University of Arizona, Tucson.
- Bedell, Melanie L.
 2000 Late Pueblo II and Pueblo III Cliff Dwellings and Community Patterns in the Grand Gulch, Southeastern Utah. Master's thesis, Department of Anthropology, Washington State University, Pullman.
- Benson, Larry V., Linda Cordell, Kirk Vincent, Howard E. Taylor, and John Stein
 2003 Ancient Maize from Chacoan Great Houses: Where was it Grown? *Proceedings of the National Academy of Science* 100(22):13111–13115.
- Benson, Larry V., D.K. Ramsey, D.W. Stahle, and K.L. Petersen
 2013 Some Thoughts on the Factors that Controlled Prehistoric Maize Production in the American Southwest with Application to Southwestern Colorado. *Journal of Archaeological Science* 40:2869–2880.
- Bredthauer, Alison Vanessa
 2010 A Towering Enigma: An Examination of Late Pueblo II and Pueblo III Towers in the Northern San Juan Region. Master's thesis, Department of Anthropology, University of Colorado, Boulder.
- Breternitz, David A., Arthur H. Rohn, Jr., and Elizabeth A. Morris
 1974 *Prehistoric Ceramics of the Mesa Verde Region*. Museum of Northern Arizona Ceramic Series No. 5. Northern Arizona Society of Science and Art, Inc., Flagstaff.
- Brown, Gary M.
 1987 *Archeological Investigations at Site 42WN1666, South Fork of Horse Canyon, The Maze District Canyonlands National Park*. Cultural Resources Report 411-1-8720. P-III Associates, Inc., Salt Lake City, Utah. Submitted to National Park Service, Rocky Mountain Regional Office, Denver.
- Byers, David A.
 2012 The Dawson Site: A Paleoindian Camp in the San Rafael Desert. *Utah Archaeology* 2012 25(1):1–14.
- Chaffee, Scott D., Marian Hyman, Marvin W. Rowe, Nancy J. Coulam, Alan Schroedl, and Kathleen Hogue
 1994 Radiocarbon Dates on the All American Man Pictograph. *American Antiquity* 59:769–781.
- Chandler, Susan
 1990 Limited Excavations at Big Horn Sheep Ruin (42SA1563), Canyonlands National Park, Utah. *Utah Archaeology* 1990 3(1):85–105.

- Coltrain, Joan Brenner, Joel C. Janetski, and Shawn W. Carlyle
 2007 The Stable- and Radio-Isotope Chemistry of Western Basketmaker Burials: Implications for Early Puebloan Diets and Origins. *American Antiquity* 72(2):301–321.
- Copeland, James M., and Richard E. Fike
 1988 Fluted Projectile Points in Utah. *Utah Archaeology 1988* 1(1):5–28.
- Cushing, Frank H.
 1884 Zuni Breadstuff—VI. Corn-Raising; or “The Regeneration of the Seed.” *The Millstone* Vol. IX, No. V1:90–95.
- Dean, Jeffrey S.
 2006 Subsistence Stress and Food Storage at Kiet Siel, Northeastern Arizona. In *Environmental Change and Human Adaptation in the Ancient American Southwest*, edited by David E. Doyel and Jeffrey S. Dean, pp. 160–179. University of Utah Press, Salt Lake City.
- Eckersley, Jaclyn Marie
 2018 The Beef Basin Occupation as an Extension of the Northern San Juan Region: An In-Depth Analysis of the Ceramics in Beef Basin, Utah. Master’s thesis, Department of Anthropology, Brigham Young University, Provo, Utah.
- Eininger, Sue
 2008 *2004–2006: River Corridor Architecture and Rock Art Survey, Canyonlands National Park, Southeast Utah*. National Park Service, Southeast Utah Group, Moab, Utah.
- Ellis, Florence Hawley
 1978 Small Structures Used by Historic Pueblo Peoples and Their Immediate Ancestors. In *Limited Activity and Occupation Sites: A Collection of Conference Papers*, edited by Alfred E. Ward, pp. 51–59. Contributions to Anthropology No. 1. Center for Anthropological Studies, Albuquerque.
- Firor, James
 1988 *"Final Stabilization" at Eight Prehistoric Sites in the Salt Creek Archeological District, Canyonlands National Park, Southeastern Utah*. Ruins Stabilization Report Technical Series 50. Nickens and Associates, Montrose, Colorado. Submitted to National Park Service, Rocky Mountain Regional Office, Denver.
 2002 *Archaeological Testing of the Bartlett Flats Pictograph Alcove (42GR382) Grand County, Utah*. Manuscript on file. Utah Division of State History, Salt Lake City.
- Geib, Phil R.
 1996 *Glen Canyon Revisited*. University of Utah Anthropological Papers No. 119. Salt Lake City.
 2011 *Foragers and Farmers of the Northern Kayenta Region: Excavations along the Navajo Mountain Road*. University of Utah Press, Salt Lake City.
- Geib, Phil R., and Dale Davidson
 1994 Anasazi Origins: A Perspective from Preliminary Work at Old Man Cave. *Kiva* 60:191–202.
- Geib, Phil R., and Helen C. Fairley
 1996 A Pueblo III Community in Glen Canyon. In *Glen Canyon Revisited*, by Phil R. Geib, pp. 185–194. University of Utah Anthropological Papers No. 117. Salt Lake City.

- Geib, Phil R., and Margaret Lyneis
 1996 Sources of Igneous Temper for Fremont Ceramics. In *Glen Canyon Revisited*, by Phil R. Geib, pp. 167–179. University of Utah Anthropological Papers No. 119. Salt Lake City.
- Gleichman, Carol L., and Peter J. Gleichman
 1992 The Lower Sand Canyon Survey. In *The Sand Canyon Archaeological Project: A Progress Report*, edited by William A. Lipe, pp. 25–31. Occasional Paper No. 2. Crow Canyon Archaeological Center, Cortez, Colorado.
- Glowacki, Donna M., Jeffrey R. Ferguson, Winston Hurst, and Catherine M. Cameron
 2015 Crossing Comb Ridge: Pottery Production and Procurement Among Southeast Utah Great House Communities. *American Antiquity* 80:472–491.
- Griffin, Dennis P.
 1984 *An Archeological Inventory of the Eastern Portions of the Salt Creek Archeological District, Canyonlands National Park*. Midwest Archeological Center, National Park Service, Lincoln, Nebraska.
- Hard, Robert J., Raymond P. Mauldin, and Gerry R. Raymond
 1996 Mano Size, Stable Carbon Isotope Ratios, and Macrobotanical Remains as Multiple Lines of Evidence of Maize Dependence in the American Southwest. *Journal of Archaeological Method and Theory* 3:253–318.
- Hartley, Ralph J.
 1991 Rock Shelters and Rock Art: An Assessment of Site Use. In *Proceedings of the Anasazi Symposium 1991*, compiled by Art Hutchison and Jack E. Smith, pp. 165–190. Mesa Verde Museum Association, Mesa Verde, Colorado.
- Hayes, Alden C.
 1964 *The Archaeological Survey of Wetherill Mesa, Mesa Verde National Park—Colorado*. National Park Service Archaeological Research Series 7A, Washington DC.
- Hogan, Patrick, Leonard Losee, and James Dodge
 1975 *Archaeological Investigation in the Maze District, Canyonlands National Park, Utah*. Volume I. Report submitted to the National Park Service, Denver, Colorado.
- Horn, Jonathon C.
 1990 *Archaeological Data Recovery at the Down Wash Site (42WN1666), Canyonlands National Park, Utah*. Alpine Archaeological Consultants, Inc. Submitted to National Park Service, Canyonlands National Park, Moab, Utah.
- Hough, Walter
 1918 *The Hopi Indian Collection in the United States National Museum*. Proceedings of the US National Museum 54(2235):235–296.
- Hunt, Alice
 1953 *Archeological Survey of the La Sal Mountain Area, Utah*. University of Utah Anthropological Papers No. 14. Salt Lake City.

- Hurst, Winston B.
 1995 Analysis of Collected Ceramic Artifacts. In *Holocene Archeology near Squaw Butte, Canyonlands National Park*, Betsy L. Tipps, pp. 68–71. Submitted by P-III Associates, Inc. to National Park Service, Rocky Mountain Regional Office, Denver.
- 2008 Analysis of Ceramic Collections from the Canyonlands National Park SEUG River Corridor Survey (CANY-520), 2005-2006. In *2004–2006 River Corridor Architecture and Rock Art Survey, Canyonlands National Park, Southeast Utah*, compiled by Susan Eininger, Appendix 4.3, National Park Service, Southeast Utah Group, Moab, Utah.
- Hurst, Winston B. and Jonathan D. Till
 2008 A Brief Survey of Great Houses and Related Features in Southeastern Utah. In *Chaco and After in the Northern San Juan*, edited by Catherine M. Cameron, pp. 44–80. University of Arizona Press, Tucson.
- Jennings, Jesse D.
 1980 *Cowboy Cave*. University of Utah Anthropological Papers No. 104. Salt Lake City.
- Jennings, Jesse D., Alan R. Schroedl, and Richard R. Holmer
 1980 *Sudden Shelter*. University of Utah Anthropological Papers No. 103. Salt Lake City.
- Kent, Kate Peck
 1957 The Cultivation and Weaving of Cotton in the Prehistoric Southwestern United States. *Transactions of the American Philosophical Society* 47:457–732.
- Kidder, Alfred V.
 1927 Southwestern Archaeological Conference. *Science* 66, Issue 1716:489–491.
- 1962 *An Introduction to the Study of Southwestern Archaeology*. Reprinted. Originally published 1924. Yale University, Andover, Massachusetts.
- Kinnear-Ferris, Sharyl
 2011 *Hopi Pottery in the Southern Utah Canyon County*. Paper presented at the 76th Annual Meeting of the Society for American Archaeology, Sacramento.
- Kinnear-Ferris, Sharyl, Winston Hurst, and Kelley Hays-Gilpin
 2015 Hopi Pottery and Prehistoric Salt Procurement in Southern Utah Canyon Country. *Kiva* 80:250–280.
- Kohler, Timothy A.
 1992 Field Houses, Villages, and the Tragedy of the Commons in the Early Northern Anasazi Southwest. *American Antiquity* 57:617–635.
- Kohler, Timothy A., and Kathryn Kramer Turner
 2006 Raiding for Women in the Pre-Hispanic Northern Pueblo Southwest? *Current Anthropology* 47(6):1035–1045.
- Kohler, Timothy A., Scott G. Ortman, Katie E. Grundtisch, Carly M. Fitzpatrick, Sarah M. Cole
 2014 The Better Angels of their Nature: Declining Violence through Time among Prehispanic Farmers of the Pueblo Southwest. *American Antiquity* 79:444–464.

- Kohler, Timothy A., Mark D. Varien, and Aaron M. Wright (editors)
 2013 *Leaving Mesa Verde: Peril and Change in the Thirteenth-Century Southwest*. University of Arizona Press, Tucson.
- Kolber, Jane
 2000 *Variations of Human Figures through Time and Space at Baird's Chevelon Steps*. 1999 IRAC Proceedings, edited by P. Whitehead and L. Loendorf, pp.66–74. American Rock Art Research Association.
- Kuckelman, Kristin A.
 2010 The Depopulation of Sand Canyon Pueblo, a Large Ancestral Pueblo Village in Southwestern Colorado. *American Antiquity* 75:497–525.
- La Fond, André
 1996 Reanalysis of the White Crack Site Chipped Stone Assemblage. In *Cultural Resource Investigations Near White Crack, Island-in-the-Sky District, Canyonlands National Park, Utah*, by Betsy L. Tipps, André D. La Fond, and Robert I. Birnie, pp. 127–175. Selections from the Division of Cultural Resources No. 11. National Park Service, Rocky Mountain Region, Denver.
- Lekson, Stephen H.
 2008 The Idea of the Kiva in Anasazi Archaeology. *Kiva* 74:203–225.
- Lewton, Frederick L.
 1912 *The Cotton of the Hopi Indians: A New Species of Gossypium*. Smithsonian Miscellaneous Collections Vol. 60., No. 6, Publication 2146. Smithsonian Institution, Washington DC.
- Lipe, William D.
 1967 *Anasazi Culture and Its Relationship to the Environment in the Red Rock Plateau Region, Southeastern Utah*. PhD dissertation, Department of Anthropology, Yale University, New Haven.
- 1993 The Basketmaker II Period in the Four Corners Area. In *Anasazi Basketmaker: Papers from the 1990 Wetherill-Grand Gulch Symposium*, edited by Victoria M. Atkins, pp. 1–10. Cultural Resource Series No 24. Bureau of Land Management, Salt Lake City.
- Lipe, William D., and Scott G. Ortman
 2000 Spatial Patterning in Northern San Juan Villages, A.D. 1050–1300. *Kiva* 66:91–122.
- Lipe, William D., and Mark D. Varien
 1999 Pueblo III (A.D. 1150–1300). In *Colorado Prehistory: A Context for the Southern Colorado River Basin*, edited by William D. Lipe, Mark D. Varien, and Richard H. Wilshusen, pp. 290–352. Colorado Council of Professional Archaeologists, Denver.
- Loendorf, Lawrence
 1985 *A Radiocarbon Date at the Rochester Creek Site, Utah*. Manuscript on file. Utah Division of State History, Salt Lake City.
- 2001 The Pectol Shields: A Repatriation Study. Manuscript on file. Utah Division of State History, Salt Lake City.
- 2004 Shields and Shield Warrior Pictographs and Petroglyphs in the Intermountain West. In *New Dimensions in Rock Art Studies*, edited by Ray T. Matheny, pp.103–117, Museum of Peoples and Cultures Occasional Papers No. 9, Brigham Young University, Provo, Utah.

- Losee, Leonard, and William Lucius
 1975 *Archaeological Investigation in the Maze District, Canyonlands National Park, Utah*. Volume II. Report submitted to the National Park Service, Denver, Colorado.
- Lucius, William A.
 1976 *Archeological Investigations in the Maze District, Canyonlands National Park, Utah*. Antiquities Section Selected Papers 3(11). Utah Division of State History, Salt Lake City.
- 1989 Ceramic Artifacts. In *Cultural Resource Inventory and Testing in Salt Creek Pocket and Devils Lane Areas, Needles District, Canyonlands National Park, Utah*, by Betsy L. Tipps and Nancy J. Hewitt, pp. 104–107. Selections from the Division of Cultural Resources No. 1, National Park Service, Rocky Mountain Region, Denver.
- 2020 Poking the Dragon: Changing the Typology of San Juan Redware and its Types for Data Reporting. *Pottery Southwest* 36(3-4):38–57.
- Malotki, Ekkehart
 2007 *The Rock Art of Arizona: Art for Life's Sake*. Kiva Publishing., Walnut, California. <https://www.bradshawfoundation.com/america/arizona/archaic/index.php>
- Martin, Curtis, Richard Ott, and Nicole Darnell
 2005 *The Colorado Wickiup Project Volume I: Context, Data Assessment and Strategic Planning*. Submitted by Dominguez Archaeological Research Group, Inc., to Bureau of Land Management, Colorado State Office, Lakewood, Colorado.
- Matson, R. G., William D. Lipe, and Diane Curewitz
 2015 Dynamics of the Thirteenth-century Depopulation of the Northern San Juan: The View from Cedar Mesa. *Kiva* 80:324–349.
- Mehls, Steven F. and Carol Drake Mehls
 1986 *Canyonlands National Park, Arches National Park, and Natural Bridges National Monument Historic Resource Study*. Report submitted to the Rocky Mountain Regional Office of the National Park Service.
- Metzger, Todd R. and Susan M. Chandler (compilers)
 1986 *Ruins Stabilization Activities in Canyonlands National Park and Natural Bridges National Monument, Report of the Year 2 Field Season 1984–1986: Appendices and Maps*. Ruins Stabilization Report Technical Series 16. Nickens and Associates, Montrose, Colorado. Submitted to National Park Service, Rocky Mountain Region, Denver.
- Montoya, Donald G.
 2008 Hidden Village (42SA2112); A Basketmaker III Community in Montezuma Canyon, Utah. Masters thesis, Department of Anthropology, Brigham Young University, Provo.
- Morris, Earl H.
 1924 *Burials in the Aztec Ruin, the Aztec Ruin Annex*. Anthropological Papers of the American Museum of Natural History, Vol. XXVI, Parts III and IV. American Museum Press, New York.
- Morss, Noel
 1931 *The Ancient Culture of the Fremont River in Utah: Report on the Explorations Under the Claflin-Emerson Fund 1928–1929*. Papers of the Peabody Museum of American Archaeology and Ethnology Vol. 12, No. 3. Harvard University, Cambridge, Massachusetts.

National Park Service [NPS]

- 1984 Request for Proposal Solicitation Number: RFP-1200-84-63, Archeological Survey and Associated Research Activities and National Register Evaluations in Canyonlands National Park. Manuscript on file, National Park Service, Rocky Mountain Regional Office, Denver.

Natural Resource Soil Conservation Service [NRCS]

- 2011 Canyonlands Area, Parts of Grand and San Juan Counties, Utah. Accessed on line at: https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/utah/canyonlandsUT2011/Canyonlands.pdf.

Neal, Leticia A.

- 2010 Moving Beyond Boundaries: Fremont and Anasazi Archaeology and Rock Art in Southeastern Utah. Master's thesis, Department of Anthropology, University of Nevada, Reno.

Noxon, John S., and Deborah A. Marcus

- 1982 *Significant Rock Art Sites in Arches and Canyonlands National Parks and in Natural Bridges National Monument, Southeastern Utah*. American Indian Rock Writing Research Co., Monticello, Utah. Submitted to National Park Service, Canyonlands National Park, Moab, Utah.

- 1985 *Significant Rock Art Sites in the Needles District of Canyonlands National Park, Southeastern Utah*. Native American Rock Art Research Associates, Monticello, Utah. Submitted to National Park Service, Canyonlands National Park, Moab, Utah.

Olsen, Nancy H.

- 1983 Mesa Verde Anasazi Rock Art: A Visual Communication System? In *Proceedings of the Anasazi Symposium, 1981*, pp. 85–106. Compiled and edited by Jack E. Smith, Mesa Verde Museum Association, Inc., Mesa Verde National Park, Colorado.
- 1984 Hovenweep Rock Art. In *Hovenweep, 1977*, edited by Julia E. Hammett and Nancy H. Olsen, pp. 93–117. Archeological Report No. 4, Office of Sponsored Programs, San Jose State University, San Jose, California.

Osborn, Alan J.

- 1995 *Aboriginal Adaptations on the Colorado Plateau, A View from the Island-In-The-Sky, Canyonlands National Park, Utah*. Occasional Papers in Anthropology No. 33. Midwest Archaeological Center, National Park Service, Lincoln, Nebraska.

Osborn, Alan J., Susan Vetter, Ralph Hartley, and Karl J. Reinhard

- 1986 *Archeological Inventory of Lavender Canyon, Salt Creek Archeological District, Canyonlands National Park*. Department of Anthropology, University of Nebraska, Lincoln.

Pierson, Lloyd M.

- 1959 *Archeological Resources of the Beef Basin, Needles, Salt Creek Mesa Area*. Ms. on file, National Park Service, Arches National Park.
- 1962 Archeological Resources of the Needles-Salt Creek Area, Utah. *Utah Archaeology: A Newsletter* 8(2):1–3.
- 1981 *Cultural Resource Summary of the East Central Portion of the Moab District 1980*. Utah Cultural Resource Series 10. Bureau of Land Management, Utah State Office, Salt Lake City.

- Reed, Alan D.
 1993 *The Archaeology of Shadow Shelter (42SA8477), Canyonlands National Park, Utah*. Alpine Archaeological Consultants, Inc. Submitted to National Park Service, Canyonlands National Park, Moab, Utah.
- Reed, Paul F., and Phil R. Geib
 2013 Sedentism, Social Change, Warfare, and the Bow in the Ancient Pueblo Southwest. *Evolutionary Anthropology* 22:103–110.
- Reimer, P., Austin, W., Bard, E., Bayliss, A., Blackwell, P., Bronk Ramsey, C., Butzin, M., Cheng, H., Edwards, R., Friedrich, M., et al.
 2020 The IntCal20 Northern Hemisphere Radiocarbon Age Calibration Curve (0–55 cal kBP). *Radiocarbon* 62:725–757.
- Rogers, Hugh C.
 2003 The Shield Bearing Warrior in Navajo Era Rock Art. *Kiva* 68:247–269.
- Rohn, Arthur H.
 2006 Northern San Juan Prehistory. In *Dynamics of Southwest Prehistory*, edited by Linda S. Cordell, and George J. Gumerman, pp. 149–178. University of Alabama Press, Tuscaloosa.
- Rouston, Cody C., Connie A. Woodhouse, and Jonathan T. Overpeck
 2011 Second Century Megadrought in the Rio Grande Headwaters, Colorado: How Unusual was Medieval Drought? *Geophysical Research Letters* 38:1–5.
- Rudy, Jack R.
 1955 *Archeological Excavations in Beef Basin, Utah*. University of Utah Anthropological Papers No. 20. Salt Lake City.
- Schaafsma, Polly
 1971 *The Rock Art of Utah from the Donald Scott Collection*. Papers of the Peabody Museum of Archaeology and Ethnology 65. Harvard University, Cambridge.
- Sharrock, Floyd W.
 1966 *An Archeological Survey of Canyonlands National Park*. Miscellaneous Paper 12. University of Utah Anthropological Papers 83. Salt Lake City, Utah.
- Schlanger, Sarah H.
 1988 Patterns of Population Movement and Long-term Population Growth in Southwestern Colorado. *American Antiquity* 53:773–793.
- Schroedl, Alan R.
 1982 *Archeological Evaluation and Site Inventory in Glen Canyon National Recreation Area, 1978*. Manuscript on file, Midwest Archeological Center, Lincoln, Nebraska.
- 2020 Clovis Locales in Utah. *Utah Archaeology* 2020 33(1) in press.
- Schroedl, Alan R., and Nancy J. Coulam
 1994 Cowboy Cave Revisited. *Utah Archaeology* 1994 7(1):1–34.

Severance, Owen

2015 Southeastern Utah – It's Not Southwestern Colorado: Milk Ranch Point's Contribution to a Revised Ceramic Sequence for Southeastern Utah. *Pottery Southwest* 31(1):25–37.

2016 Pottery Kilns and their Relationship to Unit Pueblos in Southeastern Utah. *Pottery Southwest* 32(2–3):2–11.

Schmieding, Samuel J.

2008 *From Controversy to Compromise to Cooperation: The Administrative History of Canyonlands National Park*. National Park Service. https://www.nps.gov/cany/learn/management/upload/CanyAdminHistory_forweb4.pdf

Smith, Jack E.

1987 *Mesas, Cliffs, and Canyons: The University of Colorado Survey of Mesa Verde National Park, 1971–1977*. Mesa Verde Research Papers No. 3. Mesa Verde Museum Association, Inc., Mesa Verde National Park, Colorado.

Spielmann, Katherine A., Margaret Nelson, Scott Ingram, and Matthew A. Peeples

2011 Sustainable Small-Scale Agriculture in Semi-Arid Environments. *Ecology and Society* 16(1):26. <http://www.ecologyandsociety.org/vol16/iss1/art26/>.

Thompson, Richard A.

1978 *A Stratified Random Sample of the Cultural Resources in the Canyonlands Section of the Moab District of the Bureau of Land Management in Eastern Utah*. Utah Cultural Resource Series No. 1, Bureau of Land Management, Utah State Office, Salt Lake City, Utah.

Tipps, Betsy L.

1988 *The Tar Sands Project: An Inventory and Predictive Model for Central and Southern Utah*. Utah Cultural Resource Series No. 22. Bureau of Land Management, Utah State Office, Salt Lake City.

1995 *Holocene Archeology Near Squaw Butte, Canyonlands National Park, Utah*. Selections from the Division of Cultural Resources No. 7. National Park Service, Rocky Mountain Region, Denver.

1996 *Cultural Resource Inventory in Butler Flat, Needles District, Canyonlands National Park, Utah*. Cultural Resources Report 411-03-9608, P-III Associates, Inc., Salt Lake City, Utah.

Tipps, Betsy L., and Nancy J. Hewitt

1989 *Cultural Resource Inventory and Testing in the Salt Creek Pocket and Devils Lanes Areas, Needles District, Canyonlands National Park, Utah*. Selections from the Division of Cultural Resources No.1. National Park Service, Rocky Mountain Region, Denver.

Tipps, Betsy L., André D. La Fond, and Robert I. Birnie

1996 *Cultural Resource Investigations Near White Crack, Island-in-the-Sky District, Canyonlands National Park, Utah*. Selections from the Division of Cultural Resources No. 11. National Park Service, Rocky Mountain Region, Denver.

Van Dyke, Ruth M.

2002 The Chacoan Great Kiva in Outlier Communities: Investigating Integrative Spaces across the San Juan Basin. *Kiva* 67:231–247.

Van Dyke, Ruth M., and Anthony G. King

2010 Connecting Worlds: Pueblo III Towers in the Northern San Juan. *Kiva* 75:351–375.

- Van West, Carla R., and Jeffrey S. Dean
2000 Environmental Characteristics of the A.D. 900–1300 Period in the Central Mesa Verde Region. *Kiva* 66:19–44.
- Warner, Jesse E.
1983 Figurines and Their Similarity to Rock Art Figures. *Utah Rock Art* 2:11–20.
- Western Regional Climate Center
2020 Accessed on line at: <http://www.wrcc.dri.edu>
- Wilshusen, Richard H.
2018 How Agriculture Took Hold in the Mesa Verde Region: A Review of Research on the Late Basketmaker-Early Pueblo Periods (A.D. 500–920). *Reviews in Colorado Archaeology* 2018 1(4):69–95.
- Wilshusen, Richard H., and Scott G. Ortman
1999 Rethinking the Pueblo I Period in the San Juan Drainage: Aggregation, Migration, and Cultural Diversity. *Kiva* 64:369–399.
- Winter, Joseph
1973 The Distribution and Development of Fremont Maize Agriculture: Some Preliminary Interpretations. *American Antiquity* 38:439–452.
- Wormington, Hannah M.
1955 *A Reappraisal of the Fremont Culture with a Summary of the Archaeology of Northern Periphery*. The Denver Museum of Natural History Proceedings No. 1, Denver.

APPENDIX A.

Historical Background of Needles District Archeology

Alan R. Schroedl

This discussion provides a historical context for the results of the Canyonlands Archeological Project. This appendix generally focuses on the Needles District where four of the five seasons of fieldwork were conducted during the project.

Background

Sharrock (1966), Lucius (1976), Anderson (1978), and Pierson (1981) all provide discussions of previous archeological work in the Canyonlands National Park area. Gunnerson (1959) provides a thorough review of archeological research in Utah prior to 1949. What is surprising is how few investigations were conducted in the Needles District until the 1950s. Janetski (1997) notes by the 1920s formal archaeological expeditions were occurring with regular frequency in the state of Utah along with a growing number of archeological sites being irregularly reported to state institutions.

Shortly after Jesse D. Jennings' arrival at the University of Utah in 1948, he began organizing the disparate information about archeological sites throughout the state of Utah by instituting the use of the Smithsonian trinomial site numbering system so that each site in the state received a unique identifying number. The earliest trinomial numbers in each county were sites that were previously published in archeological literature or were reported by local informants to the university. In 1949, Jennings established the Utah Statewide Archeological Survey (USAS) at the University of Utah (Gunnerson 1959). The main function of USAS was to conduct archeological reconnaissance throughout the state to assess the range and extent of Utah's archeological resources. Secondly, once the re-

connaissance was completed in an area, key sites were to be excavated to fill gaps in the culture history of Utah (Gunnerson 1959:3).

The first USAS field reconnaissance began in Washington County in southwestern Utah in 1949 by the Field Director of USAS, Jack Rudy. Rudy visited areas in the county recording new and previously recorded archeological sites in the trinomial system and assessed them for excavation potential. For the next three years Rudy continued recording sites around the state including the area that now includes Canyonlands National Park.

Currently, the Department of Heritage and Arts (DHA) of the State of Utah manages the site data which were transferred from the USAS in the 1970s (Leeflang 2016). All the site forms prior to the transfer were paper records that were hand sorted and organized.

Over the course of the years prior to the transfer, some of the very early site forms were lost or were incomplete. Others had poorly recorded locational information. At the time, site plots were maintained on small scale maps of each of the counties; detailed large-scale topographic maps were not available for many areas. The lack of clear locational information and brief site descriptions often led to sites being recorded multiple times with different trinomial numbers.

After the transfer, the DHA eventually digitized the site records and replotted the site locations. When this appendix was prepared many of the handwritten early site forms from San Juan County were available on-line through the DHA.

However recent upgrades and data hygiene efforts by DHA have made these old handwritten site forms unavailable electronically, a loss for historical researchers.

Archeological Research in the Needles District Prior to 1964

The first trinomial sites recorded in what is today Canyonlands National Park were 42SA78 and 42SA79 in the Island in the Sky District recorded by Jack Rudy on March 17 and March 19, 1952 respectively. Later in 1952, four more sites in Island in the Sky District, 42SA26, 42SA27, 42SA28, and 42SA29, were recorded by Rudy between September 8 and 10, 1952. Although these four site numbers are the earliest in the trinomial sequence for sites in the park, they were actually recorded several months later.¹ The out of sequence trinomial numbers indicates the rapid pace of archeological site recording and assignment of site numbers in the county as USAS was trying to organize the disparate site records from San Juan County.

While Jack Rudy was travelling around the state recording sites between 1949 and 1952, Alice P. Hunt, a Research Associate at the Department of Anthropology at the University of Utah, was also recording sites in southeastern Utah during this same three-year period. She recorded numerous sites around the La Sal Mountains area and several areas in and near the Needles District of Canyonlands National Park (Hunt 1953). Hunt used her own series of temporary numbers to identify sites. The trinomial system of site identification had not yet been completely implemented in San Juan County at the time.

In the spring of 1952, Bates Wilson, superintendent of Arches National Monument and advocate for a Canyonlands park, led a boy scout troop into the Horse Canyon area, which is now within the current Canyonlands National Park boundary. He and his troop mapped the location of 44 archeological sites in the Horse Canyon. The boy scout troop described the sites and created a sketch map

of the site locations; they did not collect any of the artifacts and left large prehistoric ollas in-situ instead of removing them.

Later that summer, Bates Wilson accompanied Alice Hunt to the Horse Canyon area to inspect and record some of the sites that he and the boy scout troop had discovered several months earlier (Hunt and Wilson 1952). Of the 44 site locations noted by Wilson and the boy scouts, Hunt recorded 10 of the larger sites where she made some collections of potsherds, stone tools, maize cobs, basketry fragments, and several complete pots, all of which are now curated at the Natural History Museum of Utah. All ten of these sites were assigned trinomial numbers in the summer of 1952, 42SA80-42SA89.² These were the first sites recorded in the trinomial system in the Needles District (Table 1). The artifacts Hunt collected were the first provenienced artifacts from the Needles District.

Hunt's hand-written individual site forms were initially scanned by the DHA but are not included in the current Utah site database. On the original forms, the trinomial site numbers were penciled in on the original site forms near the temporary field numbers, indicating that in 1952 the process of transitioning to the trinomial system was still underway. These sites were first reported in a memo in 1952 (Hunt and Wilson 1952:1-7). At the time, she noted, but did not collect, an eroding burial at site 42SA83.

Hunt continued to record sites in the La Sal Mountains area in 1952 and the remainder of all of the sites that Hunt recorded between 1949-1952 were reported in a University of Utah Anthropological Paper in 1953 (Hunt 1953). The handwritten site forms for these other sites are not in the digitized collection of DHA. A handwritten note in the DHA digitized archives (probably late 1952) provides a concordance list of Hunt's temporary field numbers from 1949-1952 with Utah trinomial system. Sites from Garfield and San Juan counties were also given separate trinomial designations by county. An appendix in Hunt's 1953 re-

Table A-1. Chronology of Important Archeological Investigations in the Needles District through 1990.

Year	Type of Investigation and Location	Approximate Number of Newly Recorded Sites within the Current District Boundary	Reference	Site Numbers
1940s–1950s	Reconnaissance, Needles District area	?	Anderson 1978:40	Records lost in a fire
1952	Reconnaissance, Salt Creek and Horse Canyon area	10	Hunt and Wilson 1952	42SA80-42SA89
1953	Reconnaissance, Needles Area	10	Rudy 1953:1	42SA226-42SA235
1959	Reconnaissance, Needles Area	?	Pierson 1959	42SA1374, 42SA1990-1997?
1966	Reconnaissance, Salt Creek, Horse Canyon area ^a	222	Sharrock 1966	42SA1442-42SA1663 ^a
1970	Reconnaissance, Squaw Flats to Confluence Overlook road	15	Marwitt 1970	42SA2116-42SA2130
1973	Road Alignment Survey	2	Lindsay and Madsen 1973	42SA3271, 42SA3272
1980	Inventory, Cave Spring area	22	Hartley 1980	42SA8472-42SA8493
1982–1984	Reconnaissance, Needles District Rock Art Recording	1	Noxon and Marcus 1985	42SA22690
1983–1984	Inventory, Lavender and Davis Canyons	77	Griffin 1984	42SA14813-42SA14828, 42SA14830-42SA14880, 42SA16218-42SA16227
1983–1984	Inventory, Lavender Canyon	54	Osborn et al. 1985	42SA16673-42SA16726
1985	Inventory, Salt Pocket, Devils Lane	136	Tipps and Hewitt 1989	42SA17082-42SA17106, 42SA17108-42SA17116, 42SA17118, 42SA17120, 42SA17121, 42SA17123-42SA17214, 42SA17217-42SA17223
1986	Inventory, Big Pocket area	74	This report	42SA17107, 42SA17117, 42SA17119, 42SA17122, 42SA17215, 42SA16216, 42SA17763-42SA17831
1987	Inventory, Butler Flat area	50	Tipps 1996	42SA18363-42SA18412
1988	Inventory, Squaw Butte area ^b	76	Tipps 1995	42SA20251-42SA20262, 42SA20264-42SA20308, 42SA20309-42SA20325, 42SA20263
1988–1991	Inventory, Testing, and Mitigation Visitor Center Development	7	Dominguez 1991	42SA20436-42SA20442
1989	Inventory, upper Salt Creek area	49	This report	42SA21083-42SA21131

^a Three of Sharrock's newly recorded sites had already been previously recorded (Hunt 1952; Rudy 1953).

^b The site reported as 42SA20615 is called White Bird Shelter in popular literature may have been previously recorded by Sharrock (1966) as 42SA1463.

port (Hunt 1953) provides a published table of the concordance list of temporary site numbers with the final assigned trinomial numbers. The report states that the material she collected during these other site recording efforts outside of the Needles area, and probably the original site forms, are curated at the University of Denver, where she received her Master's Degree in Anthropology in 1952.

Although Hunt's sites were assigned the earliest trinomial site numbers in the Needles District, she was apparently not the first professional archeological investigator in the Salt Creek area of the Needles. During the field seasons between 1928–1931, the Claffin-Emerson expeditions conducted archeological investigations in several areas throughout the Utah. In 1930, the team investigated sites in the portion of the Needles area that would eventually become part of Canyonlands National Park. In 1952, the only published reports from these expeditions were by Morss (1931) of investigations along the Fremont River and associated drainages in central Utah and by Brew (1946) on sites that he had excavated on Alkali Ridge in southeastern Utah. It was not until 1969 when James Gunnerson (1969) published details about the expeditions (including maps) did it become known that expedition members located eight sites along Salt Creek and three sites along Lost Canyon within the modern boundary of the Needles District (Gunnerson 1969:38–46).

Because there was no published report about these site visits available in the early 1950s, they were not integrated into the trinomial site number system in San Juan County. As early recorded and published sites, USAS would have assigned them some of the lowest trinomial numbers in San Juan County. As it was, the first trinomial numbers in San Juan County (42SA1-42SA13) were assigned to the 13 sites from Alkali Ridge reported by Brew (1946) only a few years earlier.

In the late 1940s and 1950s, under the supervision of Kenneth Ross (Ross 1966), the Explorers Club conducted a number of investigations of

archeological sites in the Salt Creek and Needles areas, but all the of site records and photographs were lost in a fire in 1959 (Anderson 1978:40) before they could be incorporated in the state trinomial system.

From the DHA archives, it appears that Jack Rudy returned to the Horse Canyon area in September of 1952, perhaps on the same trip during which he recorded sites 42SA26, 42SA27, 42SA28, and 42SA29 in the Island in the Sky. He evaluated the sites Alice Hunt recorded earlier in the summer in the Needles District and recovered an eroding burial at site 42SA83.² Anderson (1978) reports that Jack Rudy returned to the Needles District in 1953 and recorded sites 42SA226-42SA235. With the exception of 42SA231, the other site records were not included in initial scans of the DHA archives.

Between 1952 and the establishment of Canyonlands National Park in 1964, Superintendent Bates Wilson, and Lloyd Pierson, who was Supervisory Park Ranger of Arches National Monument at the time, conducted a number of visits to the Needles area with much of these efforts directed towards justifying setting aside this area as a national park (Pierson 1959,1962). Anderson (1978) indicates that 10 sites Pierson reported in 1959 were later assigned site numbers 42SA1990-42SA1997.

Archeological Research in the Needles District After 1964

Canyonlands National Park was established in 1964 around the confluence of the Green and Colorado rivers in Utah to preserve an area possessing "superlative scenic, scientific, and archeologic features for the inspiration, benefit, and use of the public" (16 U.S.C. 271; P.L. 88-590). After the establishment of the park in 1964, the NPS contracted with the University of Utah to complete an initial archeological survey of the park to understand the archeology for preservation and public interpretation. The contract results were presented in *An Archeological Survey of Canyonlands Na-*

tional Park (Sharrock 1966), however, the field work did not cover all districts of the new park. During the first year of fieldwork in 1965, Floyd Sharrock and C. Melvin Aikens conducted a reconnaissance inventory of the Needles District (Sharrock 1966). Because earlier surveys by Rudy and others had already demonstrated that masonry sites and rock art were only minimally present in the Island in the Sky District, in 1966, Sharrock, assisted by John P. Marwitt, only conducted limited additional survey in the Island in the Sky District. Sharrock did not survey in the Maze District partly because it was logistically difficult to get to and partly because of the low expectation of dramatic ruins for research and excavation. The only archeological sites in the Maze District that were known were along the Green and Colorado rivers that were reported by passing river explorers. Sharrock reports recording more than 200 archeological sites in the Needles District. Most were highly visible prehistoric structural sites or rock art panels.

By the mid-1960s when Sharrock was surveying in the park, USAS was grappling with large amounts of archeological data generated primarily from the Glen Canyon Project (Jennings 1966). The process of handling these large amounts of archeological data without the availability of computers resulted in haphazard site record keeping in San Juan County including the Needles District. Today, the DHA manages site data for tens of thousands of sites in San Juan County through computerization. In the 1960's site data were managed only with paper records sorted by hand. Even more critical to managing site data were accurate site location information.

In the 1960s, site location plots were maintained on county maps only delineated by townships and sections. The notational information for the geographic location of a site could only be presented by township, range, and section. In high site density areas, such as the Needles District, differentiating individual site locations on small scale maps was challenging. Compounding the challenge was that some areas in the Needles District sections had not been cadastrally surveyed by land

surveyors. It is not surprising in such a high site density area that archeological sites were often rerecorded by later archeologists. That problem has persisted for years in San Juan County where there have been thousands of sites that were recorded twice or three times or even more often.

Under the Smithsonian trinomial system, each site is supposed to be assigned a unique trinomial number, but rerecording is common. Sharrock's archeological survey was the first of several later inventory projects to accidentally rerecord previously recorded sites. Sharrock rerecorded three of Hunt's sites from 1952, 42SA80 as 42SSA1466, 42SA82 as 42SA1470 and 42SA86 as 42SA1491. He also rerecorded Rudy's site 42SA231 from 1953 as 42SA1506. The lack of adequate site documentation and site locational information resulted in the rerecording of a number of previously recorded sites in the Needles District among later inventories as well. Generally, these duplicate site records were corrected later and, by site numbering convention, the earliest site number takes precedent as the official site number.

After the establishment of the park in 1964, a number of archeological projects were conducted in each of the three park districts. Table 1 presents a list of significant archeological projects that occurred in the Needles District between 1952 and 1990.

In the early 1960s, although not explicitly stated in his report, Sharrock shared the USAS view that the only sites worth documenting were those that would provide useful archeological excavation data. Sites with little data potential, such as "chipping stations" (Sharrock 1966:64), were only infrequently recorded and are underrepresented in his enumeration of sites in the Needles District (Sharrock 1966:Table 3). As noted earlier in this report, and the other Canyonlands Archeological Project reports, "chipping stations", referred to as lithic scatters by archeologists today, represent a significant number of sites in the park.

In the late 1960s after Sharrock's survey, there was a shift from surveying to identify sites suitable

for excavation to identifying all sites to aid in regional interpretation. This shift made recording lithic scatters important. Just six years after the creation of the park, Marwitt (1970) conducted a road survey in the Needles District where only lithic scatters were identified, 15 in all. Lindsay and Madsen (1973) added two additional lithic scatters to the number of known sites in the Needles District.

In the 1980s, Hartley (1980) documented 22 lithic scatter scatters and rockshelters, none with any evidence of prehistoric masonry structures. Between 1983 and 1984, crews from the Midwest Archeological Center conducted inventories in portions of the Needles District including Davis and Lavender canyons, recording more than 150 sites.^{3,4} Between 1982 and 1984, Noxon and Marcus (1982, 1985) documented rock art at 14 previously recorded sites and assigned one new trinomial number to a well-known rock art site that had not been previously documented.

From 1983 to 1987, Nickens and Associates, under a contract with the NPS's Rocky Mountain Regional Office, performed ruin stabilization and maintenance work in Canyonlands National Park. In the Needles District, stabilization work was conducted at Bighorn Sheep Ruin (42SA1563), Picto-Petro Man (42SA1638), 42SA1628, Four Faces (42SA1629), All American Man (42SA1614), Paul Bunyan's Potty (42SA1374), Tower Ruin (42SA1470), Whitewash Ruin (42SA1491), and Big Ruin (42SA1586) (Fior 1988; Metzger and Chandler 1986).

Fieldwork for the Canyonlands Archeological Project was conducted between 1985 and 1990. Reports on four of the six seasons of Canyonlands Archeological Project fieldwork were published by Tipps (1995, 1996), Tipps and Hewitt (1989), and Tipps et al. (1996). The report on the 1986 field investigations in Big Pocket and the 1989 season of inventory of the Upper Salt Creek Area were not funded by the NPS. The final task that was funded under the NPS contract was to submit the field records and site forms from all years to Canyon-

lands National Park. The information on the two seasons of fieldwork in Upper Salt Creek and the summary presented here were completed by volunteers.

More than 30 years have elapsed since the completion of field work for the Canyonlands Archeological Project. Although numerous archeological projects have been conducted in the park since then, there is no current summary of the archeology of the park. Beside reporting on the two season of fieldwork in the Upper Salt Creek Area, this report provides an up-to-date summary of the prehistory of Canyonlands National Park.

Notes

1. Sometime after the establishment of the park in 1965, at least two sites in the Island in the Sky District were plotted on maps as sites 11 and 12, presumably as local temporary numbers. Because Rudy had recorded sites in the Island in the Sky area in 1952 with two-digit trinomial numbers (42SA26-42SA29), it was believed by park staff these sites were 42SA11 and 42SA12. The confusion persisted for years. The electronic records at the DHA are incomplete regarding the initial trinomial site numbers for the first dozen sites identified in San Juan County. A site form completed by Joyce Taylor in 1949 indicates that 42SA3 was assigned to Abajo 7:3, site number 3 in J. O. Brews site listing for Alkali Ridge (Brew 1946). According to DHA electronic records on September 9, 1984 Winston Hurst reported that he found some documents in the Monticello Bureau of Land Management office that the trinomial numbers 42SA1 through 42SA13 were assigned to the sites 1-13 in Brew's Alkali Ridge excavation report. Because of this discovery, sites 11 and 12 in Island in the Sky were eventually assigned the unique trinomial numbers of 42SA6219 and 42SA16806.

2. The site forms completed by Hunt in July 1952 in Horse Canyon suggest that she did not take any photos at the time of recording. However, printed photographs are attached to several of Hunt's hand-written sites forms with the typed trinomial number on the photo page. Also attached to

the site form for 42SA83 was a Universal Site Form and Continuation Sheet used by USAS with typed notes about the recovery of a burial at this site. These early testing/excavation forms do not have a blank space for the initials or name the note-taker, but the form is typed and dated September, 9, 1952. Presumably the excavator was Jack Rudy who recovered the burial and took additional photos of the sites at this time. This limited report documents the first salvage excavations in the Needles District.

3. Schmieding (2008:214) incorrectly reports that the crews from the Midwest Center Archeological Center resurveyed portions of the Salt

Creek Archeological District in Davis, Lavender, and Horse canyons and the Salt Creek drainage. The crews from the Midwest Archeological Center did conduct inventories in Davis and Lavender canyons, however, these crews did not work or record sites in the main Salt Creek drainage (Griffin 1984, Osborn et al. 1986).

4. The site numbers for 10 sites reported by Griffin (1984) were changed after the report was published. The site numbers reported in Griffin as 42SA15076-42SA15085 were later changed to 42SA16218-42SA16227.

REFERENCES

Anderson, Adrienne L.

1978 *Archeological Resources of Canyonlands, Capitol Reef and Arches National Parks and Natural Briges National Monument, Southeasten Utah*. Manuscript on file, Midwest Archeological Center, National Park Service, Lincoln, Nebraska.

Brew, John O.

1949 *Archaeology of Alkali Ridge, South-Eastern Utah*. Papers of the Peabody Museum of American Archaeology and Ethnology Vol 21. Harvard University, Cambridge, Massachusetts.

Dominguez, Steve

1991 *Preliminary Report on the 1990 Archeological Investigations for Canyonlands Needles Distrct Development*. Manuscript on file, Midwest Archeological Center, National Park Service, Lincoln, Nebraska.

Firor, James

1988 *"Final Stabilization" at Eight Prehistoric Sites in the Salt Creek Archeological District, Canyonlands National Park, Southeastern Utah*. Ruins Stabilization Report Technical Series 50. Nickens and Associates, Montrose, Colorado. Submitted to National Park Service, Rocky Mountain Regional Office, Denver.

Griffin, Dennis P.

1984 *An Archeological Inventory of the Eastern Portions of the Salt Creek Archeological District, Canyonlands National Park*. Midwest Archeological Center, National Park Service, Lincoln, Nebraska.

Gunnerson, James H.

1959 The Utah Statewide Archeological Survey: Its Background and First 10 Years. *Utah Archeology: A Newsletter* 5(4):3-16.

1969 *The Fremont Culture: A Study in Cultural Dynamics of the Anasazi Frontier*. Papers of the Peabody Museum of American Archaeology and Ethnology Vol. 21. Harvard University, Cambridge, Massachusetts.

Hartley, Ralph

1980 *Cultural Resource Inventory of Specified Areas within the Needles and Island in the Sky Districts of Canyonlands National Park*. Manuscript on file, Midwest Archeological Center, Lincoln, Nebraska.

Hunt, Alice P.

1953 *Archeological Survey of the La Sal Mountain Area, Utah*. University of Utah Anthropological Papers No. 14. Salt Lake City.

Hunt, Alice P., and Bates Wilson

1952 *Archaeological Sites in the Horse Canyon Area, San Juan County, Utah*. Manuscript on file, Department of Anthropology, University of Utah. Salt Lake City.

Janetski, Joel C.

1997 150 Years of Archaeology in Utah. *Utah Historical Quarterly* 65(2):100-133.

Jennings, Jesse D.

1966 *Glen Canyon: A Summary*. University of Utah Anthropological Papers No. 81. Salt Lake City.

Leeflang, Arie

2016 Quantifying Utah's Past: An Archaeology Data Assessment and Synthesis of Utah through 2015. *Utah Archaeology* 2016 29(1):59-89.

Lindsay, La Mar W. and Rex E. Madsen

1973 *Report of Archaeological Surveys of the Pipe Springs National Monument Water Supply System Project, Kaibab Indian Reservation, Mohave County, Arizona; Zion National Park Sewer Extension Project, Washington County, Utah; Arches National Park Road And Sewage Disposal Area Projects, Grand County, Utah And Canyonlands National Park Road Projects, Needles and Grandview Point Areas, San Juan County, Utah*. Manuscript on file, Midwest Archeological Center, National Park Service, Lincoln, Nebraska.

Marwitt, John P.

1970 *Archaeological Inspection of Proposed Road from Squaw Flat to Confluence Overlook, Canyonlands National Park Utah*. Manuscript on file Department of Anthropology, University of Utah. Salt Lake City.

Lucius, William A.

1976 *Archeological Investigations in the Maze District, Canyonlands National Park, Utah*. Antiquities Section Selected Papers 3(11). Utah Division of State History. Salt Lake City.

Metzger, Todd R. and Susan M. Chandler (compilers)

1986 *Ruins Stabilization Activities in Canyonlands National Park and Natural Bridges National Monument, Report of the Year 2 Field Season 1984-1986: Appendices and Maps*. Ruins Stabilization Report Technical Series 16. Nickens and Associates, Montrose, Colorado. Submitted to National Park Service, Rocky Mountain Region, Denver.

Morss, Noel

1931 *The Ancient Culture of the Fremont River in Utah: Report on the Explorations Under the Claflin-Emerson Fund 1928-1929*. Papers of the Peabody Museum of American Archaeology and Ethnology Vol. 12, No. 3. Harvard University, Cambridge, Massachusetts.

Noxon, John S., and Deborah A. Marcus

1982 *Significant Rock Art Sites in Arches and Canyonlands National Parks and in Natural Bridges National Monument, Southeastern Utah*. American Indian Rock Writing Research Co., Monticello, Utah. Submitted to National Park Service, Canyonlands National Park, Moab, Utah.

1985 *Significant Rock Art Sites in the Needles District of Canyonlands National Park, Southeastern Utah*. Native American Rock Art Research Associates, Monticello, Utah. Submitted to National Park Service, Canyonlands National Park, Moab, Utah.

Osborn, Alan J., Susan Vetter, Ralph Hartley, and Karl J. Reinhard

1986 *Archeological Inventory of Lavender Canyon, Salt Creek Archeological District, Canyonlands National Park*. Department of Anthropology, University of Nebraska, Lincoln.

Pierson, Lloyd M.

1959 *Archeological Resources of the Beef Basin, Needles, Salt Creek Mesa Area*. Manuscript on file, National Park Service, Arches National Park, Moab, Utah.

1962 Archeological Resources of the Needles-Salt Creek Area, Utah. *Utah Archeology; A Newsletter* 8(2):1-3.

1981 *Cultural Resource Summary of the East Central Portion of the Moab District 1980*. Utah Cultural Resource Series 10. Bureau of Land Management, Utah State Office, Salt Lake City.

Ross, Kenneth I.

1966 Letter to C. Melvin Aikens, Department of Anthropology, University of Utah, March 28, 1966. Manuscript on file at Canyonlands National Park, Moab, Utah.

Rudy, Jack R.

1955 *Archeological Excavations in Beef Basin, Utah*. University of Utah Anthropological Papers No. 20. Salt Lake City.

Sharrock, Floyd W.

1966 *An Archeological Survey of Canyonlands National Park*. Miscellaneous Paper 12. University of Utah Anthropological Papers No. 83. Salt Lake City, Utah.

Schmieding, Samuel J.

2008 *From Controversy to Compromise to Cooperation: The Administrative History of Canyonlands National Park*. National Park Service. https://www.nps.gov/cany/learn/management/upload/CanyAdminHistory_forweb4.pdf

Tipps, Betsy L.

1995 *Holocene Archeology near Squaw Butte, Canyonlands National Park, Utah*. Selections from the Division of Cultural Resources No. 7. National Park Service, Rocky Mountain Region, Denver.

Tipps, Betsy L. (editor)

1996 *Cultural Resource Inventory in Butler Flat, Needles District, Canyonlands National Park, Utah*. Cultural Resources Report 411-03-9608, P-III Associates, Inc., Salt Lake City, Utah.

Tipps, Betsy L., and Nancy J. Hewitt

1989 *Cultural Resource Inventory and Testing in the Salt Creek Pocket and Devils Lanes Areas, Needles District, Canyonlands National Park, Utah*. Selections from the Division of Cultural Resources No. 1. National Park Service, Rocky Mountain Region, Denver.

Tipps, Betsy L., André D. La Fond, and Robert I. Birnie

1996 *Cultural Resource Investigations Near White Crack, Island-in-the-Sky District, Canyonlands National Park, Utah*. Selections from the Division of Cultural Resources No. 11. National Park Service, Rocky Mountain Region, Denver.

APPENDIX B.

Understanding Prehistoric Pottery in the Needles District of Canyonlands National Park, Utah: Wider Contexts and Perspectives

William A. Lucius

As part of the Canyonlands Archeological Project, a reanalysis of Sharrock's (1966) field collection and sherds collected by park visitors held at the Needles District visitor center was undertaken in 1986. In addition to pottery, Sharrock's collection included ground stone, chipped stone and perishable artifacts, as noted below. The analyses of these pottery collections coupled with the pottery noted during the six seasons of fieldwork in the park have provided a clear picture of the cultural association of prehistoric peoples in the Needles District, demonstrating that the Formative use of the area occurred primarily during the Pueblo III period.

Sharrock Collection Analysis

On January 9, 1986, the collections from Canyonlands National Park curated by the Natural History Museum of Utah, Salt Lake City, were reviewed by William A. Lucius, who at the time was a staff archeologist with P-III Associates. The review was to satisfy a contract requirement with the NPS concerning the review of collections from Canyonlands National Park made by Floyd W. Sharrock and C. Melvin Aikens during the fall of 1965 and spring of 1966 that are housed at the Natural History Museum of Utah, Salt Lake City.

The majority of items curated by the museum and available for review consist of ceramic artifacts. Although Sharrock's (1966:70) report lists a total of 1022 pottery sherds, only 482 items are curated by the museum and are available for review (Table B-1). Sharrock (1966:70) reported that he and his field crew observed 4 sherds of the Kayenta tradition, 8 of the Fremont tradition, and

1010 sherds were assignable to the Mesa Verde Anasazi tradition.

All of the curated ceramic artifacts in the museum collection represent items manufactured in the Mesa Verde region. Neither Fremont nor Kayenta ceramics (if indeed observed in the field) were present. As documented by Table B-2, the temporally diagnostic ceramic assemblage from Table B-1, is representative of the Pueblo III (AD 1150-1300) period. The rare occurrence of Mancos Gray and Early Pueblo White sherds may be interpreted as vessel curation or as evidence of a very minor earlier presence in the area.

Major disagreements occur between Sharrock's (1966) reported pottery types and the actual types observed in the museum collection. Only one Mancos Black-on-white jar sherd (mineral paint by definition) was noted and the six sherds of a partial McElmo Black-on-white jar also exhibit mineral paint. The remainder of the curated white ware sherds with sufficient decoration for type placement easily are typeable as Mesa Verde Black-on-white. Such an assemblage supports a post-AD 1200 date for the activities responsible for the deposition of those ceramics into the archaeological record. One of those activities was caching pottery bowls (Figure B-1).

The majority of gray ware items represent corrugated body sherds. Contrary to the typological divisions presented in Sharrock (1966), corrugated body sherds cannot be consistently typed as Mancos Corrugated or Mesa Verde Corrugated, because type status is based on rim form. In fact, the presence of Mancos Corrugated items (an early

Table B-1. Count of Pottery Sherds by Ware and Types Identified from the Needles District, Canyonlands National Park.

Pottery Wares and Types	Sharrock Collection (1966)	Visitor Center Collection	Stabilization Collections	Devils Lane and Salt Pocket 1985	Butler Flat 1987	Squaw Butte 1988	Upper Salt Creek 1986, 1989	Total
Mesa Verde White Ware								
Mesa Verde Black-on-white	180		42	3			92	317
McElmo/Mesa Verde Black-on-white	2	153		3	5	11	335	509
McElmo Black-on-white	6			11	1	2	105	125
Mancos Black-on-white	1	3		5			37	46
White Ware body sherds	1	232	142	31	4	21	444	870
Mesa Verde Gray Ware								
Mesa Verde Corrugated	1	8					35	44
Dolores Corrugated	5	4		2			48	59
Mancos Corrugated	2			1			4	7
Corrugated body sherds	284	129	101	23	11	31	794	1373
Mancos Gray				1			3	4
Chapin Gray		1		5				6
Gray Ware body sherds			9	27	7	4	253	300
Mesa Verde Red Ware								
Abajo Red-on-orange							2	2
Red Ware body sherds							1	1
Kayenta Types								
Black Mesa Black-on-white		1		1				2
Tusayan Corrugated				1			1	2
Gray Ware body sherds					1			1
Tusayan Polychrome		1					1	2
Tusayan Black-on-red							3	3
Medicine Black-on-red							1	1
Hopi Types								
Jeddito Black-on-yellow		2						2
Orange body sherds		3					1	4
Total	482	537	294	114	29	69	2160	3685

Table B-2. Pottery Types of Major Time Periods by Percent of Sherds and Percent of All Periods.

Time Period/Dates Diagnostic Types	Number of Sherds	Percent of Total	Percent of All Periods
Protohistoric, AD 1540–1650			
Jeddito Black-on-yellow	2	33%	
Orange body sherds	4	67%	
Subtotal	6	100%	1%
Pueblo III, AD 1150–1300			
Mesa Verde Black-on-white	317	32%	
McElmo/Mesa Verde Black-on-white	509	51%	
McElmo Black-on-white	125	13%	
Mesa Verde Corrugated	44	4%	
Subtotal	995	100%	88%
Pueblo II, AD 950–1150			
Mancos Black-on-white	46	41%	
Dolores Corrugated	59	53%	
Black Mesa Black-on-white	2	2%	
Tusayan Polychrome	2	2%	
Tusayan Black-on-red	2	2%	
Medicine Black-on-red	1	1%	
Subtotal	112	100%	10%
Pueblo I, AD 750–900			
Abajo Red-on-orange	2	17%	
Mancos Gray	4	33%	
Chapin Gray	6	50%	
Subtotal	12	100%	1%
Grand Totals	1125		100%



Figure B-1. Mesa Verde Pueblo III bowls from the Needles District.

Pueblo II indicator) would be anomalous in a Pueblo III assemblage. The few typeable gray ware sherds of Dolores and Mesa Verde Corrugated are temporally compatible with the white ware record.

Modified ceramic items in the collection include two abraded corrugated body sherds, three abraded Mesa Verde Black-on-white sherds, two sherd scrapers, one scoop, and two spindle whorls, all of Mesa Verde Black-on-white. The presence of a ball of cotton fibers in the collection from site 42SA1586 (Big Ruin) compliments the occurrence

of ceramic spindle whorls.

Although formal temper type identification of the ceramic assemblage was not attempted, a binocular microscope was used when deemed appropriate. In general, the gray and white ware sherds exhibit sherd tempered dark pastes described by Rudy (1955) as characteristic of the Beef Basin area and observed by Hurst (2008) along the Colorado and Green river corridors. The presence of sherd temper in corrugated vessels is unusual in most areas of the Mesa Verde region, indicating that these items may represent a distinct manufacturing locale in the Beef Basin area. Occasional sherds with clay and temper attributes commonly observed in the Cortez area of Colorado were also noted.

Other items collected by Sharrock (1966) and reviewed at the Natural History Museum of Utah are listed in Table B-3. Sharrock's analysis categories of the collections have been maintained. Of the ground stone items reported by Sharrock (1966:Table 4), the museum is curating five manos and two axes. Of the chipped stone artifacts reported by Sharrock (1966: Table 4), "scrap flakes" were the most common artifact and the museum is curating only 7 flakes. Sharrock reported 21 "knives" and the museum is curating 26 bifacial tools. This category includes small bifacial tools that represent cutting tools that have received some amount of shaping and sharpening and larger bifaces that undoubtedly represent multipurpose cutting tools. The remaining classes are self-explanatory.

Sharrock (1966:70) reported a number of perishable items, including cotton cordage and a fragment of a reed mat from Big Ruin (42SA1586), as well as corn cobs and other remains of plants and animals. These perishable items are in the collection and all of the perishables presently curated by the museum are tentatively assignable to the Ancestral Puebloan occupation. Perishable remains did not include any evidence of Archaic use of the area.

Prehistoric Pottery in the Needles District

A number of pottery sherds associated with several cultural groups have been documented in the Needles District (Table B-1). Pottery production is intimately connected with communities living in residential association with the temper, clay and fuel sources selected for use (Lucius 2010). There is no evidence that pottery production took place in Canyonlands National Park. Every piece of pottery was carried into the Needles District from somewhere else, and like the tobacco tins and frying pans left behind by cowboys during a later episode of use, it is unlikely that the prehistoric visitors carried their pots out when it was time to leave.

In terms of the prehistory of human exploitation of the northern Southwest, the appearance of pottery signals the presence of the Formative stage, an agricultural adaptation reliant on the farming of domesticated crops. The Formative postdates a long Archaic stage focused on hunting and gathering of wild game (Jennings 1974:29). Named pottery types have been assigned specific date ranges of manufacture and use (Breternitz 1966) that fall within temporal periods that span the presence of Ancestral Pueblos in the northern Southwest (Hayes 1964:88). The presence of typeable sherds in a site allows for the assignment of a date of site use (Breternitz et al. 1974).

Cultural Associations

Needles District pottery was typed according to the traditional Southwestern classification of wares and types (Breternitz et al. 1974; Colton and Hargrave 1937). Classification of wares and types allows for the identification of regions or cultures responsible for the production of the pottery. As shown below and in Table B-1, the majority of pottery in the Needles District is assigned to the Mesa Verde region, but there is some evidence of long-distance interaction based on the presence of Kayenta and Hopi pottery.

Ancestral Pueblo - Mesa Verde Region

The overwhelming preponderance of sherds in Table B-1 represent use of the Needles District for food production. Indeed, the presence of pottery sherds are highly correlated with landscapes in the Needles District amenable to maize agriculture. The presence of a greater number of field houses and granaries than small cliff-dwellings in the Upper Salt Creek Area is consistent with a pattern of permanent occupation by families who planted and tended their crops in favorable field locations with extended growing seasons and stored their food in masonry granaries during the Pueblo III Period.

The presence of pottery north of the Needles District in the Island in the Sky District (Osborn 1995:209-220) and specifically Grays Pasture suggests a similar use of the landscape for farming, although Osborn's report does not provide sufficient information about site setting or a data table that assigns typological status and occurrences by site number. In terms of current ceramic typology, Osborn's (1995) report also documents a Pueblo III period of use.

Survey of sites in Lavender and Davis Canyons (Griffin 1984; Osborn et al. 1986) and North Cottonwood Creek (Davis 1975) in areas to the east of Salt Creek demonstrate small communities of Pueblo period farmers. The pottery typology that Davis (1975) used to date the sites is unusual, but in general, a Pueblo III period of use is evident. The presence of multiroom habitation sites in these canyons closely parallels the Upper Salt Creek pattern of permanent residential farming communities. Also outside of the park to the south and southwest, residential communities are reported from Beef Basin (Eckersley 2018; Rudy 1953) and Fable Valley (Baldwin 1949) showing that Mesa Verde Pueblo populations inhabited much of this region east of the Colorado River as far south as the San Juan River. It is proposed that the communities in Beef Basin and the surrounding areas budded off from various Pueblo III communities in the Blanding and Montezuma canyon areas just to the south.

Ancestral Pueblo - Kayenta Region

Readily identifiable Kayenta gray utility types, as well as red and polychrome serving types, occur in the assemblages. Because those types were commonly obtained through kinship exchange by Pueblo II and Pueblo III groups in the general Blanding area, these types were likely carried into the Needles District from there.

Protohistoric Hopi

Table B-1 includes a few Protohistoric sherds. Not included in the table are multiple Hopi Yellow Ware pots known as the Needles District Pottery Cache (Kinnear-Ferris 2011; Kinnear-Ferris et al. 2015). Those Hopi pots and occasional isolated sherds may represent Ute campsites used after trading forays with the Hopi in northern Arizona.

Fremont Complex

It is important to note that Fremont sherds do not occur in the various collections made within the Needles District. Although some sherds encountered in the Maze District were identified as Fremont (Lucius 1976), the non-collection strategy of the survey precluded formal ceramic analysis required for verification of those assignments. Analysis of ceramic grab samples collected by the NPS along the Colorado and Green river corridors (Hurst 2008:235-239, 254-259) did identify the Fremont type, Ivie Creek Black-on-white (Madsen 1977:35-38), and Fremont gray body sherds in the northwest reaches of the Green River portion of the park.

Temporal Periods of Use

Pottery types in the Southwest are assigned date ranges based on stratigraphic positions and association with tree-ring dated features and sites (Breternitz et al. 1974). Table B-2 presents the primary period of use of the Needles District through the proxy of sherd percentages by temporal period for a subset of sherds that are temporally diagnostic.

The Protohistoric and Pueblo I periods account for only two percent of the total assemblage, whereas the Pueblo III period accounts for most of

Table B-3. Non-ceramic Artifacts from Sharrock's Survey Curated by Natural History Museum of Utah.

Site Number	Axe	Mano	Chopper	Core	Hammerstone	Biface	Drill	Flake	Hafted Tool	Projectile Point	Calcite Crystal	Wood Artifact	Cotton Cordage	Feather Coth	Bone Awl	Basketry	Woven Mat	Total
42SA1400							1	1										2
42SA1410										1								1
42SA1417		1																1
42SA1443								1										1
42SA1449						1												1
42SA1451		1																1
42SA1455						1												1
42SA1460						1												1
42SA1462					1													1
42SA1463		1		1		1		1										4
42SA1465		1																1
42SA1471					1													1
42SA1472		1																1
42SA1487												2						2
42SA1501								1										1
42SA1504						1												1
42SA1505						1				1		1			1			4
42SA1512						1												1
42SA1524			1			1				1								3
42SA1527						1												1
42SA1529								1										1
42SA1532				1														1
42SA1533				1		1	1			1								4
42SA1535						1												1
42SA1539						1												1
42SA1544								1			1					1		3
42SA1549				1		1												2
42SA1550						1	1											2
42SA1552						1					1							2
42SA1554										1								1
42SA1563							1											1
42SA1571										1								1
42SA1572												1						1
42SA1577														1				1

Table B-3. Non-ceramic Artifacts from Sharrock's Survey Curated by Natural History Museum of Utah. (continued)

Site Number	Axe	Mano	Chopper	Core	Hammerstone	Biface	Drill	Flake	Hafted Tool	Projectile Point	Calcite Crystal	Wood Artifact	Cotton Cordage	Feather Coth	Bone Awl	Basketry	Woven Mat	Total
42SA1581	1																	1
42SA1586													1	1	1		1	4
42SA1590										1								1
42SA1591	1					1		1										3
42SA1593																1		1
42SA1595						1				1								2
42SA1606															1			1
42SA1610						1												1
42SA1644									1									1
Total	2	5	1	4	2	18	4	7	1	8	2	4	1	2	3	2	1	67

the recovered sherds (88 percent). Types diagnostic of the Pueblo II period are significantly lower, a data point that might indicate a low level of use at that time or the continued use of heirloom vessels.

Figure B-2 visually illustrates the main point of this paper, which is that the primary prehistoric exploitation of the Needles District was by Formative farmers of the Pueblo III period, which in turn raises the question of why? It is unlikely that the resource base of the Needles District had changed, but rather the cultural organization of Ancestral Pueblo society must have changed during the Pueblo III period to include access to the resources of Canyonlands. It is proposed that positive environmental changes or population increases may have required expansion of food production into previously unexploited landscapes just prior to abandonment of the northern Southwest at approximately AD 1300.

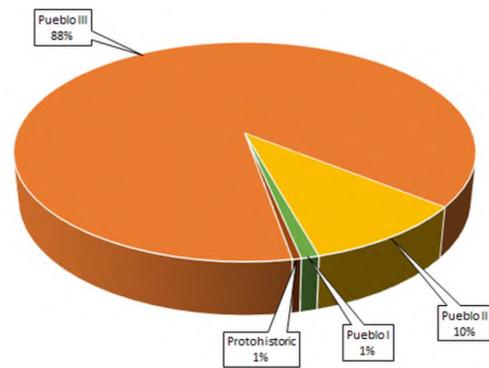


Figure B-2. Pie chart of percentage contribution to total sherd counts by time periods.

REFERENCES

- Baldwin, Gordon C.
1949 Archaeological Survey in Southeastern Utah. *Southwestern Journal of Anthropology* 5(4):393-404.
- Breternitz, David A.
1966 *An Appraisal of Tree-Ring Dated Pottery in the Southwest*. Anthropological Papers No. 10. University of Arizona, Tucson.
- Breternitz, David A., Arthur H. Rohn, Jr., and Elizabeth A. Morris
1974 *Prehistoric Ceramics of the Mesa Verde Region*. Museum of Northern Arizona Ceramic Series No. 5. Northern Arizona Society of Science and Art, Inc., Flagstaff.
- Colton, Harold S., and Lyndon L. Hargrave
1937 *Handbook of Northern Arizona Pottery Wares*. Museum of Northern Arizona Bulletin No. 11, Flagstaff.
- Davis, Larry D.
1975 An Archeological Survey of North Cottonwood Canyon, San Juan County, Southeastern Utah. Master's thesis, Department of Anthropology, Brigham Young University, Provo.
- Eckersley, Jaelyn M.
2018 The Beef Basin Occupation as an Extension of the Northern San Juan Region: An In-Depth Analysis of the Ceramics in Beef Basin, Utah. Master's thesis, Department of Anthropology, Brigham Young University, Provo.
- Hayes, Alden C.
1964 *The Archaeological Survey of Wetherill Mesa, Mesa Verde National Park – Colorado*. Archaeological Research Series 7A, National Park Service, Washington DC.
- Hurst, Winston
2008 Analysis of Ceramic Collections from the Canyonlands National Park SEUG River Corridor Survey (CANY-520), 2005–2006. In *2004–2006 River Corridor Architecture and Rock Art Survey, Canyonlands National Park, Southeast Utah*, compiled by S. Eininger, Appendix 4.3, National Park Service, Southeast Utah Group, Moab, Utah.
- Jennings, Jesse D.
1974 *Prehistory of North America*. McGraw-Hill, New York.
- Kinnear-Ferris, Sharyl
2011 *Hopi Pottery in the Southern Utah Canyon Country*. Paper presented at the 76th Annual Meeting of the Society for American Archaeology, Sacramento, California.
- Kinnear-Ferris, Sharyl, Winston Hurst, and Kelley Hays-Gilpin
2015 Hopi Pottery and Prehistoric Salt Procurement in Southern Utah Canyon Country. *Kiva* 80:250–280.
- William A. Lucius

1976 *Archeological Investigations in the Maze District, Canyonlands National Park, Utah*. Antiquities Section Selected Papers 3(11). Division of State History, Salt Lake City, Utah.

Lucius, William A.

2010 Tracking Pueblo I, Mesa Verde Region Orange Pottery Production, Exchange and Cultural Interaction: A Personal Journey of a Ceramic Archaeologist. *Pottery Southwest* 29(2):2–12.

Madsen, Rex E.

1977 *Prehistoric Ceramics of the Fremont*. Museum of Northern Arizona Ceramic Series No. 6. Flagstaff, Arizona.

Osborn, Alan

1995 *Aboriginal Adaptations on the Colorado Plateau, A View from the Island-In-The-Sky, Canyonlands National Park, Utah*. Occasional Papers in Anthropology No. 33. Midwest Archaeological Center, National Park Service, Lincoln, Nebraska.

Rudy, Jack R.

1955 *Archeological Excavations in Beef Basin, Utah*. University of Utah Anthropological Papers No. 20. Salt Lake City.

APPENDIX C.

Review of Marvin Kay's 1973 Surface Collections in Wayne and Garfield Counties, Utah

Betsy L. Tipps

As part of the Canyonlands Archeological Project, Betsy L. Tipps of P-III Associates conducted a cursory review of the artifacts collected by Marvin Kay on his road survey in Wayne and Garfield counties (Kay 1973). These artifacts were loaned to us for the purpose of collections and archival research and are currently curated at Western Archeological and Conservation Center in Tucson. The following is a categorization or summary of the data contained in the collections provided by the NPS. The NPS sent more than 200 artifacts lots for analysis.¹ The majority of these items are lithics with a very small number of other items such as corn cobs, wood, and sherds. Catalog numbers listed in the following description were assigned by the Midwest Archeological Center.

Catalog #1, Antelope Valley and North Springs, Surface Collection

The two items in this lot consist of a modified secondary flake of clear, white chalcedony with unifacial retouch along one excurvate margin as well as unifacial retouch along another incurvate margin and a small, greenish brown chert flake, secondary, with a small amount of unifacial retouch near the distal end.

Catalog #2, Road to Granary Spring, Surface Collection

The two items in this specimen lot consist of the proximal end of a clear, white with orange tint chalcedony biface and a small, thick flake with bifacial modification along both unbroken margins that appear directed at turning the artifact into a bifacial implement. The latter item is made of red-purple mottled chert.

Catalog #3, Road to Granary Springs, Surface Collection

The three items in this lot consist of middle stage secondary reduction flakes. Two are the white chalcedony without coloring and the third is a piece of opaque to translucent mottled purple to lavender chalcedony. The latter appears to be a piece of shatter.

Catalog #4, Road to Granary Springs, Surface Collection

The artifacts in this lot consist of two decortication flakes, two pieces of shatter, and two secondary flakes which are angular and represent early secondary reduction stages. Of the two decortication flakes, one is the clear, white chalcedony with an orange tint and the other is the multicolored purple-gold-orange, granular chalcedony. The pieces of shatter are grayish white, fine-grained chalcedony and reddish purple mottled chalcedony, probably from the Cedar Mesa Formation. The chalcedony item shows unifacial retouch along one margin. The two secondary flakes consist of one red chert piece and one white-gray chalcedony piece, fine grained, without colored inclusions.

Catalog #5, Road to Granary Springs, Surface Collection

The three items in this lot are secondary reduction flakes, two of them, and one tertiary flake. The secondary reduction flakes are clear, white chalcedony, one fine grained, one granular. The tertiary flake is a piece of the Cedar Mesa Formation purple chalcedony with the purple dots.

Catalog #6, Road to Granary Springs, Surface Collection

The two items in this artifact lot are tertiary flakes. One is clear, white chalcedony, probably Summerville, and the other is mottled gray and white chalcedony.

Catalog #7, Trailer Site, Surface Collection

This is a decortication flake of reddish orange-yellow Cedar Mesa Chert with some modification apparently aimed at turning it into a uniface or biface. The artifact apparently was never completed.

Catalog #8, Canyonlands Biface on Map, Surface Collection

The artifact in this lot is a slightly crescent-shaped, thin, well-flaked biface, complete, of a tannish gold chert with incipient cone cortex on one surface.

Catalog #9, Blowout A, Surface Collection

The two artifacts in this lot consist of a flake fragment and a biface fragment. The biface fragment is the tip and midsection of a purple chert, crudely flaked biface. The flake fragment is the proximal end of a clear, white chalcedony with yellow and orange patches.

Catalog #10, Blowout, Surface Collection

The artifact in this lot is one end of a rounded biface fragment of a mottled white chalcedony with red and purple inclusions. The item is highly patinated.

Catalog #11, Blowout, Surface Collection

This item is a small piece of purple-white, most likely Cedar Formation, chalcedony shatter.

Catalog #12, Site 42GA453, Surface Collection

This item is a white chalcedony secondary flake with yellow banding has unifacial retouch along one lateral margin.

Catalog #13, Site 42GA453, Surface Collection

The four items in this lot are secondary bifacial

thinning flakes of chalcedony. Three are made of very fine-grained, high-quality, white chalcedony that could be Summerville. They have some yellow mottling and deep dark brown streaks in them. The fourth piece is the gold-colored chalcedony with banding composed of white.

Catalog #14, Site 42GA454, Surface Collection

The artifact in this lot is a clear, white chalcedony secondary flake.

Catalog #15, Site 42GA647, Surface Collection

The artifact in this lot is a weathered sherd from the bottom of a corrugated vessel. The paste is dark gray and the temper is primarily sherd.

Catalog #16, Site 42GA648, Surface Collection

The single item in this artifact lot consists of the base and midsection of a square-based, multicolored gray, dark gray, orange, clear, and white chalcedony biface with retouch bifacially along both lateral margins which are still remaining.

Catalog #17, Site 42GA648, Surface Collection

The two items in this artifact lot consist of the proximal end of a brown mottled chalcedony bifacial blank made from a large flake and a large, chunky piece of multicolored gray-dark gray-orange-white mottled chalcedony with unifacial retouch along two margins that appears to have been directed towards creating the proximal end of a biface.

Catalog #18, Site 42GA649, Surface Collection

The artifact in this lot is the corner fragment of a minimally worn, indeterminate metate fragment.

Catalog #19, Site 42GA650, Surface Collection

This item is a white, fine-grained chalcedony biface with a yellow hue. It could be considered a preform.

Catalog #20, Site 42GA650, Surface Collection

The artifact in this lot is a multicolored chal-

cedony proximal biface fragment and midsection. The material appears to be crazed and ranges from reddish orange to orange to gray to clear.

Catalog #21, Site 42GA650, Surface Collection

The single item comprising this artifact lot is a modified flake of multicolored chalcedony ranging from purple to reddish orange to yellow to gray to white.

Catalog #22, Site 42GA650, Surface Collection

The single item in this lot is a bifacial thinning secondary flake of granular, white chalcedony with some orange mottling. It exhibits unifacial edge damage along both lateral margins.

Catalog #23, Site 42GA653, Surface Collection

The three items in this lot consist of two modified flakes and one uniface. One modified flake is a multicolored chalcedony secondary flake with unifacial retouch along one lateral margin extending down from the platform. The other is a purple chalcedony with orange patches with chalcedony secondary thinning flake with unifacial retouch along one lateral margin. The uniface is a large, relatively thick secondary flake of white chalcedony. The flake is broken on both ends but it is the midsection of the flake. On one end, the flake is highly polished, smoothed, and rounded as though it was used for some sort of polishing activity. On the other end, across the fracture the flake has been unifacially retouched to form a steep edge angle making a unifacial tool. There is a small amount of retouch on each lateral margin.

Catalog #24, Site 42GA1658, Surface Collection

The single item in this lot is the proximal end of a crudely flaked, multicolored purple-orange-tan chalcedony biface. The biface broke in a snap fracture due to a flaw in the raw material.

Catalog #25, Site 42GA662, Surface Collection

The artifact in this lot consists of the base and midsection of a brown banded chalcedony bifacial

blank. This is the same material we have seen in very small amounts in the Island in the Sky and the Needles and is a very fine-grained material that appears maintain the linear structure of the fossilized from which it apparently developed.

Catalog #26, Site 42GA662, Surface Collection

This is the proximal end and midsection of a red chert, crudely flaked, unfinished bifacial blank.

Catalog #27, Site 42GA663, Surface Collection

The item in this lot is a red-purple mottled chert, unfinished, crudely flaked biface midsection fragment made from a tabular piece of chert.

Catalog #28, Site 42GA663, Surface Collection

This is a mottled gold-red, fine-grained chert decortication flake with unifacial modification on the dorsal surface along one later margin and the distal end.

Catalog #29, Site 42GA663, Surface Collection

The artifact in this lot is a corner-notched, red Cedar Mesa small dart point lacking the tip, a small portion of each tang, and a small piece of the base. The point has a triangular blade and a straight base.

Catalog #30, Site 42WN370, Surface Collection

The single item in this lot is a granular, white chalcedony decortication flake with orange patches that has unifacial modification along the distal end of one lateral margin. The item has a fairly steep edge angle and was perhaps used as a scraper, although in the terminology we are using for Canyonlands it would be a uniface.

Catalog #31, Site 42WN370, Surface Collection

The artifact in this lot is a purple chalcedony, thick, core reduction flake, secondary, that has steep, unifacial retouch along one short, lateral margin.

Catalog #32, Site 42W376, Surface Collection

This item is the midsection of a small, slightly serrated arrow point made of a pinkish purple chert. Notching technology is not evident.

Catalog #33, Site 42WN376, Surface Collection

The artifacts in this lot consist of eight very tiny flakes of the same material as the projectile point (Catalog #32).

Catalog #34, Site 42WN377, Surface Collection

The single item in this specimen lot is a decoration flake of mottled purple chalcedony with an orange hue that has unifacial modification along part of one lateral margin.

Catalog #35, Site 42WN379, Surface Collection

The artifact in this lot is the gray chalcedony. It is a large, very thick, very crudely flaked, roughed out biface from which a smaller, more refined tool could be made or from which flakes could be struck flake tools.

Catalog #36, Site 42WN379, Surface Collection

The 32 items in this lot are all secondary flakes from early reduction stages. Six of these are the red-gold-purple mottled chalcedony. The remainder are all a brownish granular chert.

Catalog #37, Site 42WN382, Surface Collection

The single item in this lot is a decortication flake of gray multicolored chalcedony with orange and yellow mottling. The flake is triangular in plan and two of the margins are unifacially worked along their entire perimeter. The item was perhaps used as a uniface.

Catalog #38, Site 42WN386, Surface Collection

The two artifacts in this lot are fragmentary bifacial tools. One is the tip and midsection of a very large, thin, well-made biface. It probably served as a hafted knife. The material looks to be the yellowish variety of algalitic chert with a limey composition. Otherwise, it could perhaps be a siltstone or mudstone material. The other artifact is the very tip

of a small, crudely flake, purple and white chalcedony biface.

Catalog #39, Site 42WN386, Surface Collection

The two artifacts in this lot consist of small fragments of crudely flaked, uncompleted bifaces. One is made of a clear, white chalcedony with heavy patination. The other is made from a pinkish or purplish chalcedony with heavy patination.

Catalog #40, Site 42WN386, Surface Collection

The four items in this lot consist of two modified flakes, one unmodified flake, and one uniface. The unmodified flake is a large, decortication flake of white quartzite. The two modified flakes consist of a white chalcedony secondary flake and a pinkish chert secondary flake, both of which exhibit unifacial retouch all on one lateral margin. The uniface is a piece of purple chert, a secondary flake, one lateral margin of which has been retouched to form a scraping edge.

Catalog #41, Site 42WN386, Surface Collection

The tertiary flake in this lot is made from a white chert with little purple spots and is probably from the Cedar Mesa Formation. There is unifacial retouch along one lateral margin.

Catalog #42, Site 42WN387, Surface Collection

The two artifacts in this lot consist of a purple chalcedony, well-flaked biface midsection and a large flake of an unusual fossiliferous material that has had some attempt of flaking to turn it into a tool. The material ranges from yellow to brown with small patches of gray chert and red swirling chert intermixed in. The material looks vaguely like the algalitic chert which we saw in the Grabens during Year I, but it is not like any material we have specifically seen before. The red swirling chert occurs in very small amounts and is the same color as the Cedar Mesa Chert which we find all over Canyonlands.

Catalog #43, Site 42WN387, Surface Collection

The single item in this lot is a finely made uniface made of red, mostly like Cedar Mesa Chert. The artifact is made on a thick initial reduction flake and has unifacial retouch around both lateral margins and the entire length of the distal end, basically everything except for the platform end and the very upper end of the lateral margins. On the dorsal surface of the tool, a ridge that originally existed on the back side of the flake has been flaked out to form a convenient hand-hold for the thumb. The scraping margins on this uniface are steep, but are not of the steepest which we are traditionally calling end scrapers or side scrapers for the Canyonlands Archeological Project.

Catalog #44, Site 42WN389, Surface Collection

The single item in this lot is a piece of shatter with unifacial retouch along one margin. The material is a low-quality chert that has a grayish color with light blue spots and rougher areas that are a slightly brown color.

Catalog #45, Site 42WN390, Surface Collection

The single item in this lot consists of the proximal end of a purple chalcedony bifacial blank.

Catalog #46, Site 42WN390, Surface Collection

The two items in this lot consist of bifacial thinning flakes from an early stage, but medium stage secondary flakes. One flake is a high-quality, clear, white chalcedony with some orange patches. The other is a medium to dark gray, slightly mottled chalcedony with some remnant algal structures and small, black spots.

Catalog #47, Site 42WN391, Surface Collection

The two items in this lot consist of a uniface and a modified flake. The uniface is made on purple chalcedony from a secondary flake. The entire lateral margin, which is extant (the only one present), has been unifacially retouched from the platform to its termination where the flake is broken. The modified flake is a very large piece of an unusual material that may be some sort of siltstone

or mudstone. The material is slightly banded ranging from a greenish tan to a reddish color and exhibits unifacial retouch along one long margin. This flake is large, being approximately 13 cm in length.

Catalog #48, Site 42WN392, Surface Collection

The single artifact in this lot is the proximal end and midsection of a multicolored purple-gold-orange mottled bifacial blank.

Catalog #49, Site 42WN392, Surface Collection

This artifact lot consists of two flakes, one a secondary flake and one a piece of shatter that show unifacial retouch along one margin.

Catalog #54, Site 42WN394, Surface Collection

The flake is white chalcedony with purple and rose-orange colored mottling. The piece of shatter is much more opaque and a gray to red color.

Catalog #54, Site 42WN394, Surface Collection

The artifacts in this lot consist of two proximal ends of two bifaces. One a preform or end product that is well flaked is fashioned of a homogeneous dark gray chert. The other piece, a bifacial blank, is crudely fashioned of the purple chalcedony with black dots.

Catalog #55, Site 42WN395, Surface Collection

This item is a gold chert, very crudely flaked, uncompleted biface in the process of being made on a flake.

Catalog #56, Site 42WN395, Surface Collection

The three items in this artifact lot consist of small biface fragments or uncompleted fragments of bifaces. One is the gold chert chalcedony with the orange mottling, one is the purple chalcedony granular, and one is the granular, white chalcedony with some orange mottling.

Catalog #57, Site 42WN395, Surface Collection

This is a secondary flake of granular, white

chalcedony with yellow, dark olive greenish and orange patches.

Catalog #58, Site 42WN395, Surface Collection

The single item comprising this artifact lot is a purple chalcedony with purple dots secondary bifacial thinning flake.

Catalog #59, Site 42WN398, Surface Collection

This is the partial base and midsection of a large, unfinished, crudely flaked bifacial blank of the yellowish, rosy, orangish chalcedony. The item is highly patinated.

Catalog #60, Site 42WN398, Surface Collection

This item is a piece of white chalcedony with an orange tint shatter that has unifacial retouch along one margin.

Catalog #61, Site 42WN400, Surface Collection

The single item in this lot is a granular, white chalcedony with an orange tint secondary flake that shows a considerable amount of unifacial retouch along one semicircular margin. This item is mostly likely a uniface.

Catalog #65, Site 42WN401, Surface Collection

The single item in this lot is a small, thin secondary reduction bifacial thinning flake of white quartzite.

Catalog #66, Site 42WN402, Surface Collection

The single item in this artifact lot is a very crudely flaked, unfinished biface fragment of the rose-orange chalcedony.

Catalog #67, Site 42WN402, Surface Collection

The single item in this lot is the proximal end and midsection of a dark gray chert, crudely flaked biface. The artifact has some crystalline inclusions as well as patches of white and light blue material. The material is not like any I have seen previously in this collection.

Catalog #68, Site 42WN402, Surface Collection

The four items in this lot are all modified flakes. Two are decortication flakes of the purple-white chalcedony with some orange mottling. One is the high-quality, fine-grained, white chalcedony with the black dendrites and orange shading which is probably Summerville. One is the red-yellow mottled chalcedony. All of these flakes exhibit a small amount of modification on one margin that extends for a short distance.

Catalog #69, Site 42WN402, Surface Collection

The single artifact in this lot is a broken cobble of gray quartzite that appears to have been battered on one end. The cobble is quite small, being only about 4 cm across, and would perhaps be better classified as a pebble with pounding or battering on the one extant end.

Catalog #70, Site 42WN403, Surface Collection

The artifact in this lot is the tip of a crudely flaked, gold chert biface made from a flake. One margin of the biface shows unifacial retouch along the entire extant perimeter.

Catalog #71, Site 42WN403, Surface Collection

The two items in this lot consist of a granular, white chalcedony piece of shatter and a crude, unfinished biface fragment made from a gold and red chert nodule. The biface still has a pitted, tannish, reddish cortex remaining on one face.

Catalog #72, Site 42WN403, Surface Collection

The artifact in this lot is the margin of a thick, crudely flaked biface of the gold and red chert which may be from the Chinle Formation.

Catalog #73, Site 42WN403, Surface Collection

The four items in this lot consist of modified flakes. Two are made from the whitish chalcedony and two are made from the grayish chalcedony that ranges into multicolored with yellow and orange inclusions. In the latter group is a decortication

flake with unifacial retouch down the entire length of one long, lateral margin. Also, in the category of the gray colors is a decortication flake with considerable battering along the platform end, suggesting possibly that the cobble was used as a hammerstone prior to removal of this flake. The flake itself shows bifacial retouch along a portion of one lateral margin. The two flakes of the white chalcedony are both secondary flakes from an early reduction stage. One shows unifacial wear on the dorsal side down the entire length of one lateral margin. The other is a secondary flake with a small amount of bifacial retouch on one margin.

Catalog #74, Site 42WN405, Surface Collection

The item in this artifact lot is a small, ovoid, complete scraper that was used as both an end scraper and an end scraper. It was made on a decortication flake of medium gray chert with black speckles and light blue speckles. The material appears to have come from a river cobble. Edge angle around the scraper varies from quite steep to less moderate and there is a convenient hand-hold for the thumb on the dorsal surface of the original decortication flake forming the tool.

Catalog #75, Site 42WN405, Surface Collection

This item is a secondary flake of clear white chalcedony without color inclusions. It is the mid-section of the flake fragment and both lateral margins are unifacially modified for a short distance.

Catalog #76, Site 42WN407, Surface Collection

The two artifacts in this lot consist of a uniface and a modified flake, both made from grayish chalcedony with a few vague orange and/or yellow patches. Cortex is present on both artifacts in the form of a pitted appearance. The uniface is made on a thick, expanding flake that is wide and long. The unifacial flaking extends from almost the platform down one lateral margin and around the distal end to where the end is no longer feathered but a thick chunk of cortex and there is no flaking on the opposite lateral margin due to the presence of cortex and a perpendicular edge angle from the way

the original flake broke. The flake is quite convenient to hold being very thick at the proximal end and thinning towards the distal working end. The modified flake is made from a decortication flake that broke across the width of the flake just down from the platform creating a relatively steep edge angle. This edge has been fully flaked on the dorsal surface, creating a steep edge angle working surface on this modified flake.

Catalog #77, Site 42WN408, Surface Collection

The single artifact in this lot is a one-hand, bifacially ground, ovate, sandstone mano with two well-worn convex grinding surfaces.

Catalog #78, Site 42WN415, Surface Collection

The artifact in this lot is a white chalcedony with brown patches initial reduction flake with unifacial retouch along one lateral margin and bifacial retouch along the other lateral margin.

Catalog #79, Site 42WN416, Surface Collection

The item in this artifact lot is a multicolored chalcedony early stage secondary flake that has unifacial retouch along both lateral margins.

Catalog #80, Site 42WN417, Surface Collection

The artifact in this lot is a decortication flake from a small nodule of gold and red chalcedony. The material has a pitted, black cortex and is relatively smooth and high quality. Along one lateral margin, just down from the platform, is unifacial retouch.

Catalog #81, Site 42GA663, Surface Collection

The three items in this lot are bifacial thinning flakes of red to red-orange mottled chalcedony.

Catalog #82, Site 42GA663, Surface Collection

The four items in this lot are secondary flakes of advanced stage representing bifacial reduction. The material is red-orange mottled with some gold- or yellow-colored, most likely Cedar Formation chert-chalcedony.

Catalog #83, Site 42WN370, Surface Collection

The single artifact in this lot is a rose-colored chalcedony tertiary flake.

Catalog #85, Site 42WN370, Surface Collection

The two items comprising this artifact lot are tertiary flakes. One is fine-grained Summerville Chalcedony, the other is a mottled white chalcedony with orange and yellow coloring.

Catalog #85, Site 42WN370, Surface Collection

The 10 items in this lot are all bifacial thinning flakes representing late stages of secondary reduction. Four pieces are the fine, white chalcedony with some slight orange spots and shading that could be Summerville. One is a piece of mottled gray, fine-grained chalcedony. Two are the reddish orange chert characteristic of Cedar Mesa. One is the very dark gray, homogeneous, fine-grained chert that is present in small amounts in the Needles. One is clear chalcedony with purple mottling. This is most likely from the Cedar Mesa Formation. Another small piece is clear with purple, orange, and gray mottling. This piece could also be Cedar Mesa.

Catalog #86, Site 42WN379, Surface Collection

The two large items in this lot are both brown, granular chalcedony. One is a large, early stage secondary reduction flake that lacks cortex and the other is a large, initial reduction flake with a patch of white incipient cone cortex still remaining on the dorsal surface.

Catalog #87, Site 42WN379, Surface Collection

Forty items in this lot consist of 5 fragmentary secondary flakes of the brown, granular chalcedony, 4 red mottled purple chalcedony pieces of granular shatter, 2 of relatively fine-grained, brown chalcedony shatter, and 29 pieces of shatter with the granular, brown chalcedony.

Catalog #88, Site 42WN379, Surface Collection

The one artifact in this lot is a huge, randomly reduced core of orange and yellow chert-chalcedony made from a minimally battered cobble.

Catalog #94, Site 42WN402, Surface Collection

Twelve artifacts in this lot are all decortication flakes of chalcedony. Four are from the gray mottled chalcedony that incorporates various colors such as red and yellow. One is the red-purple chalcedony which we saw in the Island and two are the rose-orange chalcedony mottled with white which we've seen in small numbers in the Needles and the Island. One piece of the purplish white chalcedony and four pieces are white chalcedony with a small amount of orange mottling. One of these pieces is especially granular.

Catalog #95, Site 42WN402, Surface Collection

The four items in this lot consist of three secondary thinning flakes and one flake margin. The flake margin is made from the red and white multicolored chalcedony which one of the flakes is also made from. Another flake is made from a medium-grained, white chalcedony with greenish patchy inclusions and the third flake is the gray multicolored chalcedony.

Catalog #96, Site 42WN407, Surface Collection

The three artifacts in this lot consist of early stage secondary reduction flakes of chalcedony. Two are primarily off-white and one is the multicolored variety ranging from gray to rose to white.

Catalog #97, Site 42WN370, Surface Collection

There are 11 flakes in this artifact lot, 7 are definitely from the Cedar Mesa Formation and basically in the red to orange varieties. There is one piece of reddish-purple Cedar Mesa Chalcedony. In addition, there is one white chert flake that could be Cedar Mesa, a piece of white Summerville Chalcedony, a piece of white-gray chert, and a piece of medium gray chalcedony with tiny black speckles. All but one of the flakes are secondary flakes. One piece of red Cedar Mesa Chert retained

cortex.

Catalog #98, Site 42WN370, Surface Collection

The one flake in this artifact lot is a red-orange Cedar Mesa Chert secondary flake.

Catalog #99, Site 42WN370, Surface Collection

The one flake in this artifact lot is a reddish-purple Cedar Mesa Chalcedony secondary flake.

Catalog #100, Site 42WN370, Surface Collection

The one flake in this artifact lot is a Summerville Chalcedony secondary flake with a small amount of remaining cortex on the dorsal surface. The cortex is incipient cone cortex. The five items in this lot represent heavily patinated pieces of raw material. Three are obviously noncultural, two are possibly cultural and then heavily repatinated or perhaps they were not cultural at all. The material is a granular gray to white to orangish chalcedony with heavy patination and some incipient cone cortex.

Catalog #101, Site 42WN370, Surface Collection

The one secondary flake in this artifact lot is made of an unusual material that consists of white chert mottled and intermixed with a yellow to brown to orangish brown or tan more roughly textured chert. The material is relatively low quality.

Catalog #102, Site 42WN389, Surface Collection

The three secondary flakes in this lot are three different materials: one small flake of a mottled white chert, one medium gray flake with light and dark colored dots that are rather small, and one piece of gray chalcedony similar to the one noted above with the small black spots. There is some patination on the chalcedony flake.

Catalog #103, Site 42WN389, Surface Collection

The two artifacts in this lot consist of a secondary flake and a chunk of low-quality cherty materials. The flake has patches of white chert mottled with a more roughly textured brown to yellow-

ish to grayish rough chert. The shatter piece borders more on a siltstone appearing chert that ranges from pink to tannish with some light blue spots.

Catalog #104, Site 42WN389, Surface Collection

The six flakes in this lot are secondary flakes of the same gray chalcedony material. The material only appears translucent when thin or along the edges when viewed against the light. It has small, black specks and light areas that have a bluish tone. The pieces above this that were described of gray chert are most likely this same material, that is from the same source.

Catalog #105, Site 42WN403, Surface Collection

The three items in this lot represent one piece of unmodified gray- white chert with heavy patination and two cores. One randomly reduced core is of the gray chalcedony material with orange shading in some areas. It has a circular patch of crystalline inclusions which severely affected its flaking ability. This core was made from a cobble and has incipient cone cortex. The other core is bidirectional, flat like a biface, and made of an entirely different material: a red to purple chert that is possibly Cedar Mesa. The core is made on a tabular piece of stone and has a white limey deposit on one side.

Catalog #106, Site 42WN403, Surface Collection

The nine items in this artifact lot are all decortication flakes. Eight of the flakes are from the same material which is the granular, fine-grained, white to gray to gray with horn spots to rose to orange chalcedony. Cortex is as noted above. The other item is a decortication flake of gold chert with red striping or banding. This latter piece may be from the Chinle Formation.

Catalog #107, Site 42WN403, Surface Collection

The four items in this lot are early stage secondary flakes of the multicolored chalcedony discussed above.

Catalog #108, Site 42WN403, Surface Collection

The three items in this lot are early stage secondary flakes. One is of the multicolored chalcedony noted above. One piece is of the smooth, whitish yellow chalcedony of which one piece was previously noted. The third piece is a fine, clear, white chalcedony that may possibly be from the Summerville Formation. This piece, however, likes the black dendrites.

Catalog #109, Site 42WN403, Surface Collection

The single item in this artifact lot is a piece of red to rosish to orangish Cedar Mesa Chalcedony.

Catalog #110, Site 42WN403, Surface Collection

The single secondary flake in this artifact lot is of an unusual warmish brown with red spots chalcedony that I have not seen previously in this collection or in other areas of Canyonlands.

Catalog #111, Site 42WN403, Surface Collection

The single secondary flake in this lot is made of the multicolored chalcedony discussed above.

Catalog #112, Site 42WN405, Surface Collection

This artifact lot contains eight decortication flakes of the multicolored chalcedony described above and two secondary flakes that show some patination. As above, the multicolored chalcedony ranges from white to grayish to purplish to reddish to rosish to orangish, and one piece grades into a granular yellowish green semitranslucent quartzite-appearing material. Some of the chalcedony pieces are quite granular although a couple of the pieces are extremely fine grained. One of the pieces further grades into what could be categorized by itself as a mottled orange chert. Of the two secondary flakes, one is a granular white chalcedony, the other is a rose-orange chalcedony. Both of these could be from the same source as the other items. The cortex on the decortication specimens is generally white with an orangish hue. Some of it is very smooth but there are pitted areas.

The material is obviously from a cobble source.

Catalog #113, Site 42WN405, Surface Collection

The three flakes in this artifact lot are large, early stage flakes lacking cortex. They would best be considered initial reduction flakes. Two are of the granular white chalcedony that has a few orangish hues in various areas and one piece is the gray chalcedony with orange patches and areas of purplish hue.

Catalog #114, Site 42WN405, Surface Collection

The five items in this lot represent heavily patinated pieces of material. Three are obviously non-cultural, two are possibly cultural then heavily repatinated or perhaps they were not cultural at all. material is a granular gray to white to orangish chalcedony with he; patination and some incipient cone cortex.

Catalog #115, Site 42WN406, Surface Collection

Five artifacts in this specimen lot are decortication flakes of the multicolored chalcedony which in this case is all quite granular.

Catalog #116, Site 42WN406, Surface Collection

The 31 items in this artifact lot represent 27 decortication flakes and 4 flakes lacking cortex that would be early secondary reduction flakes. Twenty-six of the decortication flakes are the various chalcedonies described above. A couple of pieces are quite smooth. One decortication flake is the gold chert with the red mottling and incipient cone cortex from being battered in a stream environment. It may be Chinle Chert. Of the four early stage secondary flakes, three are chalcedony (two the gray-rose variety and one the rose variety). The fourth secondary flake is a reddish-purple chert that grades into chalcedony. This material is from the Cedar Mesa Formation and quite similar to what we saw in Island-in- the-Sky.

Catalog #117, Site 42WN406, Surface Collection

The 25 items in this lot consist of 23 early stage

secondary flakes and 2 pieces of shatter. One piece of shatter is the multicolored chalcedony; one piece is the white granular chalcedony probably the same material. Within the other category, 21 pieces are the multicolored chalcedony. Of these 21, 12 are mostly white to off-white, 1 is tan, 2 are gray-tan, 4 are multicolored gray to rose, and 2 are primarily to white to rose or reddish orange. Of the two pieces that are not chalcedony, they are both the same material which is a very granular purple to gold chert with tiny bright red spots in some areas and in the purple are some light patches of the lightest blue color.

Catalog #118, Site 42WN406, Surface Collection

The six items in this lot are all early stage secondary flakes. Five of the specimens are the white to off-white, granular chalcedony. One specimen is the red to purple Cedar Mesa Chert chalcedony.

Catalog #119, Site 42WN406, Surface Collection

One item in this lot is an angular piece of gray chalcedony with incipient cone cortex that has one flake removed. The other is a nodular piece of gray chalcedony with no evidence of cultural flaking.

Catalog #120, Site 42WN406, Surface Collection

The single item in this lot is a bifacial thinning flake of white Summerville Chalcedony with orange mottling and tiny black dendrites.

Catalog #121, Site 42WN406, Surface Collection

The five items in this lot are modified flakes with a minimal amount of edge damage such as re-touch. Four of these are the granular, white chalcedony, some with slight orange shading. The fifth ranges from gray to brownish to yellowish and is also chalcedony.

Catalog #122, Site 42WN408, Surface Collection

One item is a gray chalcedony core fragment with some slight orange tinting in certain areas. It has incipient cone cortex but is still rather angular. The other item is a decortication flake of a whitish

chalcedony with slight orange tinting. The flake appears to come from a river cobble.

Catalog #123, Site 42WN408, Surface Collection

The six items in this artifact lot are decortication flakes of various sizes and shapes. All appear to represent a single material but shows a wide range of variation. The flakes are obviously from cobbles with incipient cone cortex yet the cobbles are still subangular in some areas and ranging also into rounded. The cortex is yellowish to orangish to whitish and ranges from smooth and patinated to very rough and pitted. Variability in the material is evident. The primary color variety is light gray to medium gray to dark gray, but also shades into a brownish color, a rosish color, an orangish color, and a whitish color. Several of the pieces display red or reddish orange streaks and patches.

Catalog #124, Site 42WN408, Surface Collection

The two flakes in this artifact lot are secondary flakes. One is of a grainy white chalcedony, the other is of a very smooth and fine-grained whitish yellow chalcedony. It is not like anything I have seen before.

Catalog #125, Site 42WN408, Surface Collection

This artifact lot consists of three pieces of shatter which may or may not all be from the same material. One piece is the gray chalcedony discussed above which in this case has a somewhat granular texture. Cortex is as noted above. Another piece is grainy and white with a few patches of rose and purple color. It is possible that it is from Cedar Mesa Formation as it appears similar to some of the material we saw during Year VI in Island in the Sky at White Crack. The third piece is a clear chalcedony with orange coloring mottled throughout the interior. This piece is also somewhat granular.

Catalog #126, Site 42WN409, Surface Collection

The single item in this artifact lot is an unmodified cobble of white-gray chalcedony. The cobble has patination and incipient cone cortex.

Catalog #127, Site 42WN409, Surface Collection

The four flakes in this artifact lot are decortication flakes of a multicolored chalcedony that ranges from white to gray to orange to reddish orange. Incipient cone cortex and quarry cortex are both represented. It is possible that two different materials are represented here: one in the orange and red hues; the other in the white to gray hues with a slight purplish tinge, but this cannot be certain with such a small sample.

Catalog #128, Site 42WN412, Surface Collection

The single item in this artifact lot is a core of the multicolored chalcedony retaining a small piece of cortex.

Catalog #129, Site 42WN412, Surface Collection

The single item in this lot is a decortication flake of the multicolored chalcedony. It has an unusual red, smooth but pitted cortex.

Catalog #130, Site 42WN412, Surface Collection

The 10 flakes comprising this artifact lot are all decortication flakes in various stages ranging from early to late stages of initial reduction. Eight pieces are the multicolored chalcedony which in this case is fairly granular, generally grayish to whitish with reddish tinting and hues. One piece, which is probably from the same source, is red chert on one side and whitish chalcedony on the other. It is quite granular. The final piece is the same gold chert that may be from the Chinle Formation. It has some red streaking and a few light patches of clear chalcedony and orange or rose-colored chalcedony.

Catalog #131, Site 42WN412, Surface Collection

Two items in this artifact lot are early stage secondary flakes; one of multicolored chalcedony, one of clear, white, granular chalcedony.

Catalog #132, Site 42WN412, Surface Collection

The eight pieces in this lot are not culturally modified pieces or examples of the raw material.

All but one is the multicolored chalcedony which in this case includes an example that grades into the warm brown color noted above indicating that it is indeed from the same source. One piece is a red cherty chunk that could very easily be Cedar Mesa Chert.

Catalog #133, Site 42WN376, Surface Collection

The six items in this lot consist of white quartzite with black spots which may or may not be cultural. One of the items in this lot is a decortication flake of the purple- orange-yellow mottled chalcedony material, although in this case, the material is fairly opaque. The other piece is the same material but non-cultural.

Catalog #135, Site 42WN376, Surface Collection

Two of the items in this lot consist of shatter with some cortex remaining. Both are made of the multicolored purple-orange-gold chalcedony. The third piece is a secondary flake from early stages of the same granular material.

Catalog #136, Site 42WN376, Surface Collection

The four items in this lot consist of large, unmodified chunks of the quartzite material noted above. The material is generally white but has many black inclusions to the point of making it appear salt and pepper or gray. One piece has some yellowish shading.

Catalog #137, Site 42WN376, Surface Collection

The four items in this lot are a tested cobble, a piece of shatter, and two chunks. The tested cobble is gray, granular chalcedony with some orange shading. Two flakes have been driven off a natural platform. The material has a white cortical deposit that ranges into yellow with a few black areas. The material has several fracture planes in it which may indicate why the nodule was not reduced further. The piece of shatter is a reddish purple, granular chalcedony shading into orange. The two chunks are the same material, both displaying the white, cortical material. The primary color on one

is purple with orange bands shading into yellow. The other specimen is a whitish lavender color with bright orange splotches, reddish purple blotches, yellow streaking, and crystalline patches. It grades on one side into a very fine-grained, orange-yellow-purple material, but on the other side it is granular and in one area is somewhat limey.

Catalog #138, Site 42WN376, Surface Collection

The four items in this lot are all decortication flakes. Two are primarily the gold chalcedony with orange or red shading. This material is relatively fine grained. Another piece is the reddish purple, relatively fine-grained chert and one piece which is quite large is granular, reddish purple chalcedony with some of the gold material at one end.

Catalog #139, Site 42WN376, Surface Collection

The 10 items in this artifact lot all consist of decortication flakes. One flake is made from a moderately fine-grained piece of gray chalcedony. The remaining pieces all consist of the multicolored, granular chalcedony in the purple to orange to gold range and one of the pieces further grades into a lavender color. This material is not high quality due to the presence of fracture planes, crystalline patches, and the granularity of the material itself.

Catalog #140, Site 42WN376, Surface Collection

This artifact lot contains three pieces of shatter, all retaining cortex. The material ranges from the multicolored, granular, purple-gold chalcedony to a somewhat more fine-grained, reddish purple chalcedony with orange banding.

Catalog #141, Site 42WN376, Surface Collection

This consists of a large, angular piece of shatter of the red-purple Cedar Mesa Chalcedony that grades into gold on one end. There is some slightly modification along one margin, possibly indicating a utilized flake.

Catalog #142, Site 42WN376, Surface Collection

The single item in this lot is a secondary flake of the red-purple, granular, mottled chalcedony which is most likely from the Cedar Mesa Formation.

Catalog #143, Site 42WN376, Surface Collection

The single item in this lot is an unmodified piece of multicolored chalcedony raw material.

Catalog #144, Site 42WN377, Surface Collection

The two items in this lot are cores. One is made from a cobble of reddish purple with yellow and orange mottling chalcedony. The other is made from the gray chalcedony. The latter piece is broken into two pieces which can be refitted together. The first core is multidirectional, the second is somewhat more bidirectional as in a large biface.

Catalog #145, Site 42WN377, Surface Collection

Two of the items in this lot are decortication flakes; one of the gray chalcedony, one of the multicolored gray-orange tannish chalcedony. The other piece is an unmodified chunk of cortex and raw material of the gray chalcedony. All three pieces are rather granular.

Catalog #146, Site 42WN377, Surface Collection

The two items in this lot are decortication flakes. One piece is the gold-red-orange mottled chalcedony. The other piece is gray with orange shading chalcedony. The latter is quite granular.

Catalog #147, Site 42WN377, Surface Collection

The single item in this lot is a decortication flake of granular, grayish white chalcedony.

Catalog #148, Site 42WN388, Surface Collection

This is a tabular piece of mottled purple and lavender chert with some rose shading and dark speckles.

Catalog #149, Site 42WN388, Surface Collection

The single item in this lot is a secondary flake of mottled purple- orange and white chalcedony.

Catalog #150, Site 42WN395, Surface Collection

The three items in this lot consist of a large piece of reddish-purple grading into gold chert-chalcedony shatter and two cores, both made of off-white to grayish granular chalcedony.

Catalog #151, Site 42WN395, Surface Collection

The two items in this lot consist of a piece of off-white to gray chalcedony shatter and a piece of reddish-purple chalcedony from most likely the Cedar Mesa Formation. The latter flake is an early stage secondary flake.

Catalog #152, Site 42WN395, Surface Collection

The 19 items in this lot are all decortication flakes. Five of these flakes are the gold-colored chert that has some red shading in some areas. One flake is the purple-red Cedar Mesa Chalcedony and two flakes are the orangish rose chalcedony and some mottling of lavender, white, and yellow. One flake is dark reddish-purple chert. Two flakes consist of white chalcedony. One is fine grained and clear and could be from the Summerville Formation. The other is an unusual piece that grades into a less translucent, fine-grained chert. Two pieces are gray, fine-grained chalcedony with orange mottling and four pieces are tannish gray chalcedony with orange mottling. The final two pieces are more chertlike and have brownish and lavenderish colors there, especially granular.

Catalog #153, Site 42WN395, Surface Collection

The 11 items in this lot are all secondary flakes from early to middle stages. Five are granular, grayish brown chalcedony, two are gold chalcedony, one is the reddish-purple chalcedony, one is the orange-rose chalcedony, one is clear, white, fine-grained chalcedony (probably Summerville), and one is light purple chalcedony with purple spots. It is from the Cedar Mesa Formation.

Catalog #154, Site 42WN395, Surface Collection

This artifact lot contains seven secondary

flakes, two decortication flakes, and one piece of shatter. The secondary flakes are two of the brownish gray granular chalcedony, three white-gray granular chalcedony, one mottled reddish purple-orange chalcedony, and piece of lavender-purple chalcedony. The shatter is a piece of red mottled, most likely Cedar Mesa Formation Chert. The two decortication flakes are mottled red-clear-orange chalcedony to chert.

Catalog #156, Site 42WN395, Surface Collection

The single item in this lot is a clear, white chalcedony secondary flake.

Catalog #156, Site 42WN395, Surface Collection

The single item in this lot is a clear mottled orange chalcedony secondary flake representing a late stage of bifacial reduction.

Catalog #157, Site 42WN395, Surface Collection

The three items in this lot are all chalcedony bifacial thinning flakes. One is the purple Cedar Mesa Chalcedony, one appears to be the fine-grained, clear, white Summerville Chalcedony with some slight orange shading, and one piece is the gold chalcedony that possibly is from the Chinle Formation.

Catalog #158, Site 42WN395, Surface Collection

The five items in this lot are bifacial thinning flakes representing secondary reduction. One is made of a granular, gray chert, another from a fine-grained, clear chalcedony, two are white-rose-orange chalcedony, and one is the lavender with red spots Cedar Mesa Chalcedony.

Catalog #159, Site 42WN395, Surface Collection

The four items in this lot are bifacial thinning flakes representing secondary reduction. One is a dark gray chalcedony with black spots, one is orange-white mottled chalcedony, one is gray chalcedony, and one is tan-gray chalcedony. The latter three are all granular.

Catalog #160, Site 42WN395, Surface Collection

The nine items in this lot are all chalcedony bifacial thinning flakes. Two are the lavender with red spots Cedar Mesa Chalcedony, one is a red-orange-rose chalcedony, one is dark gray chalcedony with darker black spots, one is yellowish brown, three are the grayish chalcedony, and one is less translucent and gray with orange spots.

Catalog #161, Site 42WN410, Surface Collection

The single item in this lot is a large piece of granular, gray chalcedony shatter.

Catalog #162, Site 42WN410, Surface Collection

The single item in this lot is a gray chert with speckles decortication flake.

Catalog #163, Site 42WN410, Surface Collection

The four items in this lot are raw material specimens, four of which are the granular, gray chalcedony and one of which appears to be a piece of purple quartzite.

Catalog #164, Site 42WN411, Surface Collection

The single artifact in this lot is a small tested nodule of very fine-grained, siliceous, dark purple chert that is unlike any other chert we have seen thus far in the collection.

Catalog #165, Site 42WN411, Surface Collection

The four items in this artifact lot are chalcedony decortication flakes, one of which is primarily white with no inclusions but granular, two of which are whitish gray with some yellow tinting, also granular, and one which is gray with some shading into rose and orange, also granular.

Catalog #166, Site 42WN411, Surface Collection

The single flake in this lot is an early stage secondary flake of granular chalcedony that shades into rose and yellowish green.

Catalog #167, Site 42WN413, Surface Collection

Three items in this lot consist of an unmodified piece of chalcedony, a chunk of chalcedony (?), and a core. The material is quite variable. The first piece ranges from white chert to granular, gray chalcedony to gray chalcedony with the orange shading. The second piece ranges from the yellow chert-appearing material to the brown, granular chalcedony, clearly indicating that the gold chert and the brown chalcedony are from the same source since they appear on the same nodule. This same piece grades into the rose-colored chalcedony. The third piece ranges from white to lavender to purple chalcedony with a small patch of orange shading along the perimeter near the cortex on one side.

Catalog #168, Site 42WN413, Surface Collection

The two items in this lot are decortication flakes, both of a granular chalcedony. One is gray and shades into the orange hues, the other has patches of white and patches of the gold material.

Catalog #169, Site 42WN413, Surface Collection

Two items in this lot are decortication flakes of gray multicolored into the rose- and orange-colored chalcedony.

Catalog #170, Site 42WN413, Surface Collection

The two items in this lot may or may not be cultural. They are heavily patinated made from clear chalcedony that along the margin shades into purple and orange. Both pieces retain cortex and if they are cultural, they would be considered decortication flakes.

Catalog #171, Site 42WN413, Surface Collection

The three items in this lot are noncultural raw material samples. One is a clear chalcedony that grades into orange and rose, The second is multicolored yellow, orange, purple, and clear, and the third is the orange-rose shading within the material.

Catalog #172, Site 42WN414, Surface Collection

The four items in this lot represent two cores and two unmodified chunks of the mottled gray, granular chalcedony with some orange shading.

Catalog #173, Site 42WN414, Surface Collection

The two items in this lot represent a decortication flake and a piece of shatter, both of which are made of dark gray, granular chalcedony with crystalline patches and areas of orange shading, particularly adjacent to the cortical rim.

Catalog #174, Site 42WN414, Surface Collection

The three items in this lot are noncultural material specimens of the gray, granular chalcedony with some orange shading. On one piece the material grades into a white with an orange hue chert-chalcedony.

Catalog #175–228

These were not individually examined because the material types are the same as those noted in the previous boxes.

Catalog #229, Site 42WN379, Surface Collection

The nine artifacts in this specimen lot consist of decortication flakes exhibiting a wide variety of colors. Four pieces are primarily gray in color and may be from the Chinle Formation. Another piece is gold-colored chert. Two additional pieces range from purple to reddish orange to yellow to gray. An additional piece appears similar to Cedar Mesa Chert in the red to purple variety with some yellow and orange banding along the side. The final piece is a large chunk of grainy purple chalcedony.

Catalog #230, Site 42WN379, Surface Collection

The 40 flakes are all decortication flakes. Fifteen of these flakes are the granular gray to brown chalcedony. Nine additional flakes range from red to purple. The remaining 16 flakes are somewhat varied, and multicolored. Three pieces are granular and have a color that is somewhat tannish with a purple hue.

Catalog #231, Site 42WN379, Surface Collection (lot 2)

The 47 items in this lot are decortication flakes. Most of the material divides into two main categories. There are 34 pieces of brownish granular chalcedony. An additional 13 pieces from the site are in the red to reddish purple range with the occasional gold mottling. Some of these pieces have crystalline inclusions which affected the flakeability.

Catalog #232, Site 42WN391, Surface Collection

The single item in this lot is a purple-red chert core.

Catalog #233, Site 42WN391, Surface Collection

Two items in this lot are decortication flakes and a third is an early stage secondary flake. The two decortication flakes are a very low-quality, grainy, light purple chert with a variegated or mottled appearance. The third flake is a piece of gold chert.

Catalog #234, Site 42WN391, Surface Collection

The two flakes in this artifact lot are secondary flakes. One is made of Summerville Chalcedony, the other is made from a purple and red chalcedony that is most likely from the Cedar Mesa Formation.

Catalog #235, Site 42WN392, Surface Collection

The single item in this lot is a red Cedar Mesa chert core. with approximately 20% cortex on one side. The material appears very similar to and may be Cedar Mesa Chert.

Catalog #236, Site 42WN392, Surface Collection

The four items in this artifact lot are decortication flakes. One is the granular white chalcedony, one is a banded, brownish gray chalcedony. The third flake is red Cedar Mesa Chert. The final flake is a dark gray spotted chert.

Catalog #237, Site 42WN392, Surface Collection

This lot consists of two secondary flakes. One is of a fine-grained, white chalcedony which could

be Summerville and the other is of a mottled red-maroon-yellow piece of chert that could be Cedar Mesa.

Catalog #238, Site 42WN392, Surface Collection

This lot consists of two decortication flakes and one piece of shatter. All three pieces are made from an off-white chalcedony that is relatively fine grained and one piece exhibits crazing characteristics of failed heat treatment.

Catalog #239, Site 42WN392, Surface Collection

The single item in this lot consists of a secondary flake of high-quality, clear, white chalcedony that is probably Summerville.

Catalog #240, Site 42WN392, Surface Collection

The two items in this artifact lot are secondary and tertiary flakes. The secondary flake is made from the light gray chalcedony. The other flake is made from an indeterminate material that could be algalitic chert.

Catalog #242, Site 42WN399, Surface Collection

Four items in this lot consist of one core, two large pieces angular shatter, and one heavily patinated, unmodified piece of stone. The material on all four specimens is a grayish chalcedony that is slightly granular.

Catalog #243, Site 42WN399, Surface Collection

The two items in this lot represent a decortication flake and an unmodified nodule, both of the gray chalcedony.

Catalog #244, Site 42WN399, Surface Collection

The three flakes in this lot are all decortication flakes of the gray chalcedony.

Catalog #245, Site 42WN399, Surface Collection

The four items in this lot consist of three pieces of shatter and one decortication flake of the granular, gray chalcedony.

Catalog #246, Site 42WN399, Surface Collection

Four of the five pieces in this artifact lot consist of nondiagnostic shatter of granular, gray to tanish with an orangish hue chalcedony. One piece is a secondary flake fragment of granular chalcedony that is brownish in color and has an orangish or rose hue.

Catalog #248, Site 42WN400, Surface Collection

The single item in this lot consists of a crudely flaked, unfinished biface (blank) of the granular, gray chalcedony that has a slightly brownish hue.

Catalog #249, Site 42WN400, Surface Collection

The four items in this lot consist of three cores and one piece of shatter. The material of all four specimens is chalcedony. One is dark gray and slightly granular with rust-colored inclusions. Another is light to dark gray with large patches of the reddish orange or rose color. This piece has numerous fracture planes in it. The smallest core, which is exhausted, is granular and white with no colored inclusions. The piece of shatter is gray in color with rose- and rust-colored patches and a small amount of cortex.

Catalog #249, Site 42WN400, Surface Collection

(This was the second one as #249) The single item in this lot is a decortication flake of the gold-colored chert that has an area which abruptly grades into a purplish chalcedony.

Catalog #250, Site 42WN400, Surface Collection

The six items in this lot consist of decortication flakes of chalcedony. One large flake is multicolored with different bands of gray, yellow, orange, and rose. Two other pieces are primarily gray but have orange shading on one side and two additional pieces are the white, clearish chalcedony. All of the pieces are granular. The final piece is clear with rose and orange speckles and shading within it.

Catalog #251, Site 42WN400, Surface Collection

The single item in this artifact lot consists of a very large, early stage secondary flake of granular, gray shading into a brown hue chalcedony.

Catalog #252, Site 42WN400, Surface Collection

The items in this lot consist of two decortication flakes and one piece of shatter, all made of the clearish chalcedony that is granular and has a slightly yellowish or tannish hue. The pieces are all highly patinated.

Catalog #253, Site 42WN400, Surface Collection

The three items in this lot are all gray chalcedony.

Catalog #254, Site 42WN401, Surface Collection

The two items in this lot are decortication flakes of grayish brown chalcedony. This chalcedony is similar to that noted above, except lacks the orange inclusions.

Catalog #255, Site 42WN401, Surface Collection

This lot consists of three secondary flakes resulting from bifacial thinning. One appears to be Summerville Chalcedony, another is an orangish white chalcedony, and the other is the multicolored reddish purple-gray chalcedony.

Catalog #256, Site 42WN401, Surface Collection

This lot consists of five secondary bifacial thinning flakes of the clear, white chalcedony with some slight orange mottling and a few black dots. All of these appear to be Summerville Chalcedony.

Catalog #257, Site 42WN401, Surface Collection

This lot consists of four pieces of chalcedony shatter. One is the gray chalcedony but lacks any of the red inclusions, another is the very slick and shiny whitish yellow or yellowish white chalcedony, and another is grainy, whitish grayish to rose-colored chalcedony. The fourth piece is the same as the first piece.

Catalog #258, Site 42SA8515, Unknown Project

This artifact lot consists of eight lots of corn cobs that generally have two or three cob fragments within them, although several have numerous small fragments.

Catalog #260-64, Site 42SA1614, Nickens and Associates' Ruins Stabilization

See Nickens and Associates' 1983 stabilization at All American Man for further information (Metzger 1983).

Catalog #265, Site 42SA1626, Nickens and Associates' Spring 1983 Ruins Stabilization

See Nickens and Associates' 1983 stabilization on an unnamed ruin for more information (Metzger 1983).

Catalog #266-67, Site 42SA1629, Four Face Ruin, Nickens and Associates' Ruins Stabilization

See Nickens and Associates' 1983 stabilization at Four Faces Ruin for more information (Metzger 1983).

Summary

The Marvin Kay collection was dominated by lithics or chipped stone artifacts, as well as unworked, raw material. The collection included lithic artifacts or lithic material from 10 sites in Garfield County and 33 sites in Wayne County. Only one sherd was in Kay's collection. Many of the chipped stone artifacts were large flakes with cortex, representing early stages of tool production. The technology used to produce these flakes included both core-flake reduction and bifacial reduction. The early stages of reduction and the presence of unworked material in the collection indicates these sites were near the sources of the tool stone material.

The most common material in the collection was chalcedony, with chert less common. The most frequently noted material was a gray chalcedony that shades into orange, red, and yellow. The next most common material was a brown chalcedony. The sources of these tool stone materials

are unknown, but they probably were collected nearby, given the presence of cortex and the large, angular debris.

Of the lithic material that could be sourced, the purple-red chalcedony is known to occur in the Cedar Mesa Formation and the clear-to-white chalcedony comes from the Summerville Formation. Among the cherts, a red-gold chert from the Chinle Formation and the red chert from the Cedar Mesa Formation were present in the collection.

Notes

1. Several lots of artifacts from the stabilization work conducted by Nickens and Associates in the Needles District were accidentally included in the shipment. While these lots are listed below, the reader is referred to the original report (Metzger 1983), which gives analysis within the contexts of the sites they were recovered from.

REFERENCES

Kay, Marvin

1973 *Archaeological Road Surveys in Canyonlands and Capitol Reef National Parks and Adjacent Bureau of Land Management Areas, Wayne and Garfield Counties, Utah*. Manuscript on file Midwest Archeological Center, National Park Service, Lincoln, Nebraska.

Metzger, Todd

1983 *The Structural Stabilization of Four Prehistoric Ruins in the Salt Creek Archeological District, Canyonlands National Park*. Ruins Stabilization Report 2. Nickens and Associates, Montrose Colorado.

Tipps, Betsy L., and Nancy J. Hewitt

1989 *Cultural Resource Inventory and Testing in the Salt Creek Pocket and Devils Lanes Areas, Needles District, Canyonlands National Park, Utah*. Selections from the Division of Cultural Resources No. 1. National Park Service, Rocky Mountain Region, Denver.

Tipps, Betsy L., André D. La Fond, and Robert I. Birnie

1996 *Cultural Resource Investigations Near White Crack, Island-in-the-Sky District, Canyonlands National Park, Utah*. Selections from the Division of Cultural Resources No. 11. National Park Service, Rocky Mountain Region, Denver.

APPENDIX D.

Radiocarbon Dates from the Needles District and Bayesian Chronological Modeling of Selected Time Periods

Nancy J. Coulam

One of the contributions of the Canyonlands Archeological Project was adding 32 radiocarbon samples to the database of all the radiocarbon dates available from Canyonlands National Park. Twenty-two of these samples were from the Needles District, seven samples came from the White Crack area of the Island in the Sky District, and three were associated with rock art sites in the Maze District.

With the addition of the Canyonlands Archeological Project radiocarbon samples, there are 118 radiocarbon dates that have been recovered from various archeological sites or features in the Needles District. Some of these radiocarbon dates have been previously published, but most are unpublished and were generously shared by Laura Martin, Park Archeologist of Canyonlands National Park.

As discussed below, 9 of the radiocarbon determinations were rejected from this analysis. Of the remaining dates, 8 were from the Protohistoric period, 66 from Pueblo III, 4 from Pueblo II, and 31 from the Archaic through Pueblo I, with these periods defined in the report in Table 3. This appendix presents the site numbers and laboratory numbers of the documented radiocarbon samples from the Needles District, the uncalibrated radiocarbon determinations provided by the various radiocarbon laboratories, the calibrated date ranges, and Bayesian chronological models for several of the time periods and a separate model for the prehistoric corn. A few previously unreported radiocarbon determinations from the Island in the Sky District and Maze District are also provided for the in-

terested reader.

A brief summary of how to interpret radiocarbon information is provided here. Samples of organic matter are submitted to a radiocarbon laboratory that assigns a laboratory number and provides a radiocarbon age of the organic material in years before present (BP) along with an associated error that reflects the laboratory's uncertainty about the age estimate. The radiocarbon age in years BP plus or minus the laboratory error is called the conventional radiocarbon age (CRA) or radiocarbon determination.

Calibrations are required to convert the CRA in years BP to calendar years *anno domini* (AD) or before Christ (BC). All calibrations (and models) provided here were performed using the statistical package OxCal 4.4 (Bronk Ramsey 2009a) with the IntCal20 calibration curve (Reimer et al. 2020) with five-year curve resolution. The calibrations are reported for the 95% highest probability density range. This means the actual date in calendar years AD/BC has a 95% chance of being within the calibrated date range computed by the OxCal 4.4 software program and presented in the tables below.

Bayesian Chronological Models

Since the 1950s, different radiocarbon calibration curves and formula have been used to calibrate individual CRA, but beginning in the 1990s, Buck and others (1996) developed Bayesian statistical methods to calibrate groups of multiple radiocarbon determinations to calendar years. Bayesian chronological models basically compress or narrow the scatter of date ranges together when they

are assigned to a group.

Bayesian chronological models (sequential phase models) of the CRA from the Needles District were developed to calibrate the dates that were grouped into the Protohistoric, the Pueblo II–III time periods, and the Late Archaic. A separate Bayesian chronological model was created using the 54 corn (*Zea mays*) samples from the Needles District.

Outliers to the chronological models were identified by the OxCal 4.4 software program and were eliminated from the models by applying the methods discussed by Bronk Ramsey (2009b). Radiocarbon samples that the OxCal 4.4 software program identified as outliers are shown in bold type in the tables below. The tables present both the unmodeled and modeled calibrated dates.

Rejected Radiocarbon Determinations and Chronological Hygiene

Each of the Needles District CRA was reviewed to ensure it was correctly tabulated and associated with an archeological event of interest. Nine CRA were rejected for the following reasons. Two rejected CRA were obtained from charcoal samples from Structure 18 in Bighorn Sheep Ruin (42SA1563) that Chandler (1990) determined were too early given the style of Pueblo III architecture of this room and associated pottery. Radiocarbon sample Beta-57042 was collected to assist in documenting the looting of Dopki Cave (43SA17119), but the sample was rejected because the provenience was uncertain. One corn cob (GX-33200) from 42SA25540 was temporally ambiguous. This corn cob dated to cal AD 430–640, which is several hundred years earlier than all other corn samples from the Needles District so it seems likely it was incorrectly reported or was otherwise erroneous.

Five CRA from the excavations conducted by the Midwest Archeological Center from 1988–1991 are rejected because they could not be verified at this time. Dominguez (1994) listed one CRA from site 42SA20309, but in a final report on this site (Dominguez 1999), three different CRA

were listed, but no laboratory numbers were provided and provenience information about the samples is unclear. Additional samples may have been analyzed as part of the Midwest Archeological Center investigation of site 42SA20263, but they could not be confirmed at this time. It is possible the radiocarbon laboratory results of these investigations are in the archives at the Western Archeological and Conservation Center in Tucson where the collections are curated. Archival research might clarify these CRA. All of the rejected CRA from the Needles District are listed in Table D-1.

Protohistoric Period

Across the Needles District, eight CRA date to the Protohistoric or Pueblo IV period. Table D-2 presents the calibrated modeled and unmodeled dates. Six of these Protohistoric dates were from the cache of salt in gourds and Hopi Yellow Ware pottery vessels previously reported by Kinnear-Ferris (2011; Kinnear-Ferris et al. 2015). While five of these dates were interpreted as representing a single depositional caching event, the IntCal20 calibration curve and OxCal 4.4 software program indicate the samples are not statistically contemporaneous with each other.

A Bayesian chronological model of the Protohistoric dates (Table D-2) identified the two most recent dates from the salt cache as outliers. These two samples are statistically contemporaneous and can be pooled to a single date of cal AD 1495–1660. This pooled date plus the dates from the organic matter in the cache that post-date AD 1400 corroborate the date range of AD 1385–1629 for the most temporally diagnostic of the Hopi Yellow Wares in the cache—Sikyatki Polychrome (Hays-Gilpin 2014).

Outside Canyonlands National Park in the Abajo and La Sal mountains, there are documented co-occurrences of Hopi Yellow Wares with Navajo pottery and other evidence of Protohistoric Navajo and Numic people (Pierson 1981; Thompson 1978). It seems likely that the radiocarbon dates falling into the AD 1400s–1600s, coupled with the rare Hopi Yellow Ware vessels and sherds in and

Table D-1. Rejected Radiocarbon Determinations.

Site	Lab Number	CRA (BP)	$\delta^{13}\text{C}$	Material	Site Name	Reason for Rejection	Source
42SA01563	Beta-19916	1180±60		charcoal	Bighorn Sheep Ruin	Charcoal from hearth, too early	Chandler 1990
42SA01563	Beta-19915	1840±70		charcoal	Bighorn Sheep Ruin	Charcoal in mortar, too early	Chandler 1990
42SA17119	Beta-57042	540±50		phragmites	Dopki Cave	Association uncertain	NPS files
42SA20263		1450±60		charcoal		Unconfirmed	Dominguez 1999
42SA20309	Beta-34978	3710±230	-25.0	charcoal		Association uncertain	Dominguez 1994
42SA20309		650±60				Provenience unclear	Dominguez 1999
42SA20309		790±95				Provenience unclear	Dominguez 1999
42SA20309		4058±351		charcoal		Provenience unclear	Dominguez 1999
42SA25540	GX-33200	1520±40		corn cob	Three and Half Faces	Reporting error	NPS files

around the Needles District (Appendix B), represent sporadic occupation of this portion of south-east Utah by Protohistoric hunter-gatherers who could be either Numic (Ute, Southern Paiute) or Athapaskan.

The two earliest Protohistoric dates shown in Table D-2 are from corn cobs that could represent the end of Pueblo III or the beginning of Pueblo IV and the Protohistoric. These corn cobs likely represent the last of the Pueblos who lived in the Needles District before emigrating to the south.

Corn Dates and the Duration of Pueblo III

Short-lived organics provide the highest quality radiocarbon samples. Corn is a short-lived organic that provides an excellent data set to understand the Formative period occupation of the Needles District. Not including the one rejected corn sample (GX-33200), there are 54 radiocarbon determinations from corn samples from the Needles District. A Bayesian chronological model of these corn samples was created to obtain the narrowest statistically modeled date range for corn agriculture in the Needles District. The model identified five corn samples as outliers: the two Protohistoric corn samples (Beta-291478, Beta-248922) and

three early outliers (GX-33195, GX-33202, Beta-248929). These outliers are shown in bold in Table D-3 which presents both the Bayesian calibrated modeled and unmodeled dates. The three early outliers can be statistically combined into one calibrated Pueblo II date: cal AD 990–1150.

Without the five outliers, the modeled span of corn agriculture (95% probability) was from cal AD 1170–1220 to cal AD 1275–1300. The OxCal 4.4 program calculated the temporal span represented by these corn dates as 65–120 years. This span or duration of corn agriculture in the Needles District was used to calculate the momentary population estimates of the Pueblo III occupation in the report.

Pueblo II and Pueblo III

In the Mesa Verde region, tree-ring dating has established the Pueblo II period as AD 900–1150 and Pueblo III as AD 1150–1300. From the Needles District, there are 70 CRA that could date to the Pueblo II-III periods. A Bayesian chronological model identified four samples as early outliers: GX-33195, GX-33202, Beta-248929, and OS-13942. These four outliers date to Pueblo II and are shown in bold type in Table D-4.

Table D-2. Time Span of Protohistoric Period in the Needles District and the Modeled and Unmodeled Radiocarbon Dates.

Modeled Time Span of the Protohistoric Cal AD/BC (95%)							
Phase start: AD 1175–1395 Phase end: AD 1450–1705 Span (years): 75–485							
Protohistoric Period Radiocarbon Determinations							
Site	Lab Number	CRA (BP)	Unmodeled Cal AD (95%)	Modeled Cal AD (95%)	δ^{13}	Material	Source
Salt cache^a	Beta-291475	290±40	AD 1480–1795		-21.9	gourd	Kinnear-Ferris et al. 2015
Salt cache	Beta-291473	300±40	AD 1475–1660		-21.6	yucca	Kinnear-Ferris et al. 2015
Salt cache	Beta-291474	360±40	AD 1450–1640	AD 1440–1605	-23.1	gourd	Kinnear-Ferris et al. 2015
Salt cache	Beta-291477	380±40	AD 1440–1635	AD 1430–1620	-24.2	juniper bark	Kinnear-Ferris et al. 2015
Salt cache	Beta-291476	440±40	AD 1405–1620	AD 1410–1505	-24.0	gourd	Kinnear-Ferris et al. 2015
42SA01558	Beta-263678	570±40	AD 1300–1430	AD 1305–1435		cordage	NPS files
Salt cache	Beta-291478	620±30	AD 1300–1430	AD 1305–1435	-8.5	corn	Kinnear-Ferris et al. 2015
42SA26097	Beta-248922	640±40	AD 1280–1400	AD 1290–1405		corn	NPS files

^a**Bold represents a group outlier.**

Table D-3. Time Span of Corn Dates in the Needles District and the Modeled and Unmodeled Radiocarbon Dates. ^a

Modeled Time Span of Corn Agriculture Cal AD/BC (95%)						
Phase Starts: AD 1170–1220 Phase Ends: AD 1275–1300 Span (years): 65–120						
Pueblo III Period Radiocarbon Determinations						
Site	Lab Number	CRA (BP)	Unmodeled Cal AD/BC (95%)	Modeled Cal AD/BC (95%)	$\delta^{13}\text{C}$	Site Name
Salt cache^b	Beta-291478	620±30	AD 1295–1400		-8.5	Needles Salt Cache
42SA26097	Beta-248922	640±40	AD 1280–1400			
42SA26524	Beta-248924	670±40	AD 1270–1400	AD 1255–1300		
42SA30217	Beta-332262	690±30	AD 1270–1390	AD 1265–1295	-8.6	
42SA01648	PRI-13-114-11	713±26	AD 1265–1385	AD 1260–1295	-9.5	
42SA30208	Beta-332252	720±30	AD 1230–1385	AD 1225–1295	-9.2	
42SA01617	Beta-420233	730±30	AD 1225–1380	AD 1225–1290	-8.8	
42SA01659	Beta-332261	740±30	AD 1225–1300	AD 1225–1290	-8.8	
42SA26844	Beta-304979	740±30	AD 1225–1300	AD 1225–1290	-8.7	
42SA26720	Beta-248930	750±40	AD 1215–1380	AD 1220–1290		
42SA01643	Beta-332254	750±30	AD 1220–1290	AD 1225–1290	-9.2	
42SA30186	Beta-310472	750±30	AD 1220–1290	AD 1225–1290	-8.6	
42SA01642	PRI-13-114-28	751±26	AD 1225–1290	AD 1225–1285	-10.1	
42SA01558	GX-33186	760±30	AD 1220–1285	AD 1220–1285		
42SA01645	Beta-332257	760±30	AD 1220–1285	AD 1220–1285	-9.5	
42SA27757	Beta-332251	760±30	AD 1220–1285	AD 1220–1285	-9.0	
42SA30189	Beta-332250	760±30	AD 1220–1285	AD 1220–1285	-9.2	
42SA30215	Beta-332258	760±30	AD 1220–1285	AD 1220–1285	-9.2	
42SA04751	Beta-248927	760±40	AD 1210–1380	AD 1220–1285		
42SA30190	Beta-332249	770±30	AD 1220–1285	AD 1220–1285	-9.2	
42SA30206	Beta-332260	770±30	AD 1220–1285	AD 1220–1285	-10.4	
42SA01552	GX-33182	780±40	AD 1175–1290	AD 1215–1285		
42SA01617	Beta-420232	780±30	AD 1215–1280	AD 1220–1280	-11.2	
42SA01660	PRI-13-114-46	786±28	AD 1215–1280	AD 1220–1280	-10.1	
42SA28135	GX-33201	790±40	AD 1175–1285	AD 1210–1285		
42SA30208	Beta-332253	790±30	AD 1210–1280	AD 1215–1280	-9.6	
42SA01642	PRI-13-114-26	792±26	AD 1220–1280	AD 1220–1275	-9.4	
42SA01623	GX-33194	800±40	AD 1170–1280	AD 1205–1280		
42SA01549	GX-33183	800±30	AD 1180–1280	AD 1215–1280		
42SA01553	GX-33184	800±30	AD 1180–1280	AD 1215–1280		
42SA01645	Beta-332256	800±30	AD 1180–1280	AD 1215–1280	-9.1	
42SA01660	PRI-13-114-48	805±26	AD 1180–1280	AD 1215–1275	-9.8	
42SA30192	Beta-310474	810±30	AD 1175–1280	AD 1205–1275	-10.6	
42SA30206	PRI-13-114-42	813±27	AD 1175–1275	AD 1210–1275	-9.0	
42SA30206	PRI-13-114-43	837±27	AD 1165–1265	AD 1195–1270	-9.8	
42SA01626	GX-33196	840±30	AD 1160–1270	AD 1190–1270		
42SA01602	GX-33189	850±40	AD 1045–1275	AD 1190–1270		Gourd Grotto
42SA04751	Beta-248928	850±40	AD 1045–1275	AD 1190–1270		
42SA26524	Beta-248923	850±40	AD 1045–1275	AD 1190–1270		

Table D-3. Time Span of Corn Agriculture in the Needles District. ^a (continued)

Pueblo III Period Radiocarbon Determinations						
Site	Lab Number	CRA (BP)	Unmodeled Cal AD/BC (95%)	Modeled Cal AD/BC (95%)	$\delta^{13}\text{C}$	Site Name
42SA01554	GX-33185	860±30	AD 1050–1265	AD 1185–1265		
42SA01622	GX-33192	860±30	AD 1050–1265	AD 1185–1265		
42SA30192	Beta-310473	860±30	AD 1050–1265	AD 1185–1265	-10.9	
42SA01604	GX-33190	870±30	AD 1045–1265	AD 1185–1265		
42SA01628	GX-33197	870±30	AD 1045–1265	AD 1185–1265		
42SA01643	Beta-332255	880±30	AD 1045–1230	AD 1185–1260	-9.3	
42SA30206	Beta-332259	880±30	AD 1045–1230	AD 1185–1260	-10.1	
42SA01628	GX-33198	880±40	AD 1040–1260	AD 1185–1265		
42SA01374	Beta-74060	890±80	AD 1020–1275	AD 1190–1280	-9.8	Paul Bunyan's Potty
42SA25533	GX-33199	900±40	AD 1035–1220	AD 1185–1265		Kilt Man
42SA01602	GX-33188	910±50	AD 1025–1225	AD 1185–1265		Gourd Grotto
42SA01617	GX-33191	910±40	AD 1035–1220	AD 1185–1265		
42SA28136	GX-33202	970±40	AD 990–1165			
42SA01626	GX-33195	1000±40	AD 985–1160			
42SA26720	Beta-248929	1040±40	AD 890–1150			

^a All CRA from NPS files except of the Needles Salt Cache (Kinneary-Ferris et al. 2015).

^b **Bold represents group outlier.**

The most culturally important outlier is sample OS-13942 from a Mesa Verde Anasazi site (42SA16680) in Lavender Canyon. This radiocarbon sample was obtained from a portion of a scarlet macaw feather apron (Hargrave 1979) (Figure D-1). The reported CRA (Borson et al. 1998:133) was obtained from a sample of the tassel-eared squirrel pelt (*Sciurus aberti ferreus*) that forms the belt attached to the scarlet macaw feathers. While the 95% calibrated date range for this squirrel pelt extends from Pueblo II into the Pueblo III period (cal AD 1035–1210), this date range is earlier than the other Pueblo III dates from the Needles District.

The identification of this date as a statistical outlier indicates this exotic artifact was created prior to the major occupation of the Needles District. This date and its archeological context support the likelihood that this unique artifact was an heirloom transported to the region during the Pueblo III period and cached in an otherwise nondescript Pueblo III site.

After combining the two pigment samples re-

ported by Chaffee and others (1994) from the All-American Man Pictograph (42SA1614; AA-8359, AA-8361) and eliminating the outliers (bolded in Table D-4), there are 65 calibrated Pueblo III radiocarbon dates from the Needles District. A Bayesian chronological model of all these samples (corn, wood, charcoal, etc.) dates the earliest portion of the Pueblo III occupation of the Needles District to cal AD 1180–1220 and terminates the occupation in cal AD 1275–1300 (95%). The OxCal program calculated the span of the Pueblo III period in the Needles District as 65–115 years.

Late Archaic

Table D-5 presents the Late Archaic through pre-Pueblo III radiocarbon dates. If the Late Archaic period begins sometime after the abrupt cooling of the climate at 4200 BP and ends with the introduction of pottery after AD 500, there are 62 radiocarbon dates from Canyonlands National Park plus the adjacent Orange Cliffs of Glen Canyon National Recreation Area (Bungart 1996) that fall within this date range. Modelling these radiocarbon dates using OxCal 4.4 and IntCal 20, the three dates closest to 4200 BP are identified by the

Table D-4. Time Span of Pueblo III Period in the Needles District and the Modeled and Unmodeled Radiocarbon Dates.

Modeled Time Span of Pueblo III Period Cal AD/BC (95%)								
Phase Starts: AD 1180–1220 Phase Ends: AD 1275–1300								
Pueblo III Period Radiocarbon Determinations								
Site	Lab Number	CRA (BP)	Unmodeled Cal AD/BC (95%)	Modeled Cal AD/BC (95%)	$\delta^{13}\text{C}$	Material	Site Name	Source
Salt cache^a	Beta-291478	620±30	AD 1295–1400		-8.5	corn	Needles Salt Cache	Kinnear-Ferris et al. 2015
42SA26097	Beta-248922	640±40	AD 1280–1400			corn		NPS files
42SA26524	Beta-248924	670±40	AD 1270–1400	AD 1260–1300		corn		NPS files
42SA08489	Beta-42339	670±80	AD 1220–1425	AD 1215–1295		unknown		SHPO files
42SA01614	AA-8359, AA-8361	680±46	AD 1265–1400	AD 1225–1300		pigment	All-American Man	Chaffee et al. 1994
42SA30217	Beta-332262	690±30	AD 1270–1390	AD 1265–1295	-8.6	corn		NPS files
42SA01558	Beta-263677	690±40	AD 1260–1395	AD 1230–1300		wood		NPS files
42SA01648	PRI-13-114-11	713±26	AD 1265–1385	AD 1260–1295	-9.5	corn		NPS files
42SA30208	Beta-332252	720±30	AD 1230–1385	AD 1225–1295	-9.2	corn		NPS files
42SA01617	Beta-420233	730±30	AD 1225–1380	AD 1225–1295	-8.8	corn		NPS files
42SA01511	Beta-113299	730±40	AD 1220–1385	AD 1225–1290	-22.4	juniper bark	Roadside Ruin	NPS files
42SA01659	Beta-332261	740±30	AD 1225–1300	AD 1225–1290	-8.8	corn		NPS files
42SA26844	Beta-304979	740±30	AD 1225–1300	AD 1225–1290	-8.7	corn		NPS files
42SA01643	Beta-332254	750±30	AD 1220–1290	AD 1225–1290	-9.2	corn		NPS files
42SA30186	Beta-310472	750±30	AD 1220–1290	AD 1225–1290	-8.6	corn		NPS files
42SA26720	Beta-248930	750±40	AD 1215–1380	AD 1220–1290		corn		NPS files
42SA26133	Beta-248919	750±40	AD 1215–1380	AD 1220–1290		basket		NPS files
42SA01642	PRI-13-114-28	751±26	AD 1225–1290	AD 1225–1285	-10.1	corn		NPS files
42SA01645	Beta-332257	760±30	AD 1220–1285	AD 1220–1285	-9.5	corn		NPS files
42SA01558	GX-33186	760±30	AD 1220–1285	AD 1220–1285		corn		NPS files
42SA30189	Beta-332250	760±30	AD 1220–1285	AD 1220–1285	-9.2	corn		NPS files
42SA30215	Beta-332258	760±30	AD 1220–1285	AD 1220–1285	-9.2	corn		NPS files
42SA27757	Beta-332251	760±30	AD 1220–1285	AD 1220–1285	-9.0	corn		NPS files
42SA04751	Beta-248927	760±40	AD 1210–1380	AD 1220–1290		corn		NPS files
42SA01563	Beta-19918	760±50	AD 1175–1385	AD 1215–1290		charcoal	Bighorn Sheep Ruin	Chandler 1990
42SA01470	Beta-63519	760±60	AD 1160–1390	AD 1205–1290	-25.0	juniper bark	Tower Ruin	NPS files
42SA30190	Beta-332249	770±30	AD 1220–1285	AD 1220–1285	-9.2	corn		NPS files

Table D-4. Time Span of Pueblo III Period in the Needles District and the Modeled and Unmodeled Radiocarbon Dates. (continued)

Pueblo III Period Radiocarbon Determinations								
Site	Lab Number	CRA (BP)	Unmodeled Cal AD/BC (95%)	Modeled Cal AD/BC (95%)	$\delta^{13}\text{C}$	Material	Site Name	Source
42SA30206	Beta-332260	770±30	AD 1220–1285	AD 1220–1285	-10.4	corn		NPS files
42SA01617	Beta-420232	780±30	AD 1215–1280	AD 1220–1280	-11.2	corn		NPS files
42SA01552	GX-33182	780±40	AD 1175–1290	AD 1215–1285		corn		NPS files
42SA01660	PRI-13-114-46	786±28	AD 1215–1280	AD 1220–1280	-10.1	corn		NPS files
42SA30208	Beta-332253	790±30	AD 1210–1280	AD 1215–1280	-9.6	corn		NPS files
42SA28135	GX-33201	790±40	AD 1175–1285	AD 1210–1285		corn		NPS files
42SA01642	PRI-13-114-26	792±26	AD 1220–1280	AD 1220–1275	-9.4	corn		NPS files
42SA01553	GX-33184	800±30	AD 1180–1280	AD 1215–1280		corn		NPS files
42SA01549	GX-33183	800±30	AD 1180–1280	AD 1215–1280		corn		NPS files
42SA01645	Beta-332256	800±30	AD 1180–1280	AD 1215–1280	-9.1	corn		NPS files
42SA01623	GX-33194	800±40	AD 1170–1280	AD 1205–1280		corn		NPS files
42SA04974	Beta-86577	800±50	AD 1050–1295	AD 1205–1285	-26.3	wood	Lathrop	NPS files
42SA01563	Beta-19917	800±60	AD 1045–1380	AD 1200–1285		charcoal	Bighorn Sheep Ruin	Chandler 1990
42SA01660	PRI-13-114-48	805±26	AD 1180–1280	AD 1215–1275	-9.8	corn		NPS files
42SA30192	Beta-310474	810±30	AD 1175–1280	AD 1205–1275	-10.6	corn		NPS files
42SA30206	PRI-13-114-42	813±27	AD 1175–1275	AD 1210–1275	-9.0	corn		NPS files
42SA01559	GX-33187	820±30	AD 1175–1275	AD 1205–1275		mat		NPS files
42SA01629	Beta-104466	830±60	AD 1040–1285	AD 1195–1280	-9.2	yucca	Four Faces	NPS files
42SA30206	PRI-13-114-43	837±27	AD 1165–1265	AD 1195–1270	-9.8	corn		NPS files
42SA01626	GX-33196	840±30	AD 1160–1270	AD 1195–1270		corn		NPS files
42SA01622	GX-33193	840±40	AD 1050–1275	AD 1195–1275		cattail		NPS files
42SA17823	Beta-263679	840±40	AD 1050–1275	AD 1195–1275		bighorn sheep		NPS files
42SA26524	Beta-248923	850±40	AD 1045–1275	AD 1190–1270		corn		NPS files
42SA04751	Beta-248928	850±40	AD 1045–1275	AD 1190–1270		corn		NPS files
42SA01602	GX-33189	850±40	AD 1045–1275	AD 1190–1270		corn	Gourd Grotto	NPS files
42SA01622	GX-33192	860±30	AD 1050–1265	AD 1190–1265		corn		NPS files
42SA01554	GX-33185	860±30	AD 1050–1265	AD 1190–1265		corn		NPS files
42SA30192	Beta-310473	860±30	AD 1050–1265	AD 1190–1265	-10.9	corn		NPS files
42SA01604	GX-33190	870±30	AD 1045–1265	AD 1190–1265		corn		NPS files
42SA01628	GX-33197	870±30	AD 1045–1265	AD 1190–1265		corn		NPS files

Table D-4. Time Span of Pueblo III Period in the Needles District and the Modeled and Unmodeled Radiocarbon Dates. (continued)

Pueblo III Period Radiocarbon Determinations								
Site	Lab Number	CRA (BP)	Unmodeled Cal AD/BC (95%)	Modeled Cal AD/BC (95%)	$\delta^{13}\text{C}$	Material	Site Name	Source
42SA01643	Beta-332255	880±30	AD 1045–1230	AD 1185–1260	-9.3	corn		NPS files
42SA30206	Beta-332259	880±30	AD 1045–1230	AD 1185–1260	-10.1	corn		NPS files
42SA01628	GX-33198	880±40	AD 1040–1260	AD 1190–1265		corn		NPS files
42SA20209	Beta-263680	880±40	AD 1040–1260	AD 1190–1265		basket	Peekaboo	NPS files
42SA01555	Beta-74061	880±60	AD 1035–1265	AD 1190–1275	-25.0	squash	Junction Ruin	NPS files
42SA01374	Beta-74060	890±80	AD 1020–1275	AD 1195–1280	-9.8	corn	Paul Bunyan's Potty	NPS files
42SA25533	GX-33199	900±40	AD 1035–1220	AD 1190–1260		corn	Kilt Man	NPS files
42SA08489	Beta-42341	900±110	AD 895–1295	AD 1195–1285				NPS files
42SA01617	GX-33191	910±40	AD 1035–1220	AD 1185–1260		corn		NPS files
42SA01602	GX-33188	910±50	AD 1025–1225	AD 1190–1265		corn	Gourd Grotto	NPS files
42SA16680	OS-13942	920±35	AD 1035–1210		-15.3	squirrel	Macaw feather apron	Borson et al. 1998
42SA28136	GX-33202	970±40	AD 990–1165			corn		NPS files
42SA01626	GX-33195	1000±40	AD 985–1160			corn		NPS files
42SA26720	Beta-248929	1040±40	AD 890–1150			corn		NPS files

*Bold represents group outlier.

Table D-5. Archaic to Pueblo I Unmodeled Radiocarbon Dates from the Needles District.

Site	Lab Number	CRA (BP)	Unmodeled Cal AD/BC (95%)	$\delta^{13}\text{C}$	Material	Site Name	Source
Pueblo I							
42SA20251	Beta-30481	1170±60	AD 680–995		charcoal		Tipps 1995
42SA08489	Beta-42342	1260±110	AD 595–995		unknown		SHPO files
42SA20615	Beta-30488	1360±80	AD 540–880		sediment	White Bird Shelter	Tipps 1995
Late Archaic							
42SA20258	Beta-30483	1500±100	AD 260–775		charcoal		Tipps 1995
42SA26127	Beta-248933	1680±40	AD 250–535		basket		NPS files
42SA21117	Beta-31964	1670±80	AD 230–570	-25.0	charcoal		this report
42SA08489	Beta-42336	1740±50	AD 220–420		unknown		SHPO files
42SA17216	Beta-19284	1720±80	AD 130–535	-25.0	charcoal		this report
42SA17141	Beta-21208	2080±60	355 BC–AD 80	-25.0	charcoal		Tipps and Hewitt 1989
42SA21091	Beta-31962	2070±70	355 BC–AD 120	-25.0	charcoal		this report
42SA08477	Beta-57401	2040±80	355 BC–AD 205		charcoal	Shadow Shelter	Reed 1993
42SA20292	Beta-30484	2120±60	360 BC–AD 15	-25.0	charcoal		Tipps 1995
42SA08489	Beta-42340	2160±90	400 BC–AD 20		charcoal		SHPO files
42SA20292	Beta-30485	2220±70	405 BC–55 BC	-25.0	sediment		Tipps 1995
42SA20256	Beta-30482	2220±90	485 BC–AD 5	-25.0	charcoal	Squaw Butte Cove	Tipps 1995
42SA08489	Beta-42338	2280±130	765 BC–45 BC		unknown		SHPO files
42SA20301	Beta-30487	2330±90	760 BC–175 BC	-25.0	charcoal	Whirlwind Ridge	Tipps 1995
42SA20301	Beta-30486	2640±100	1045 BC–420 BC	-25.0	charcoal	Whirlwind Ridge	Tipps 1995
42SA20615	AA-9179	2710±70	1045 BC–775 BC	-21.1	pigment	White Bird Shelter	Tipps 1995
42SA20286	Beta-33710	2490±210	1125 BC–50 BC		unknown		Dominguez 1994
42SA08477	Beta-57402	3130±70	1535 BC–1215 BC		charcoal	Shadow Shelter	Reed 1993
42SA17092	Beta-21209	3340±100	1885 BC–1425 BC		charcoal	Salt Pocket Shelter	Tipps and Hewitt 1989
42SA08477	Beta-57404	3180±270	2140 BC–810 BC		charcoal	Shadow Shelter	Reed 1993
Early to Middle Archaic							
42SA20615	Beta-37954	5290±80	4330 BC–3965 BC		charcoal	White Bird Shelter	Tipps 1995
42SA17107	Beta-31790	5890±70	4945 BC–4550 BC	-25.0	charcoal		this report
42SA21095	Beta-31963	6290±110	5480 BC–4995 BC	-25.0	charcoal		this report

Table D-5. Archaic to Pueblo I Unmodeled Radiocarbon Dates from the Needles District. (continued)

Site	Lab Number	CRA (BP)	Unmodeled Cal AD/ BC (95%)	$\delta^{13}\text{C}$	Material	Site Name	Source
Table D-5. Archaic to Pueblo I Unmodeled Radiocarbon Dates from the Needles District.							
42SA17790	Beta-18736	6580±100	5710 BC–5330 BC	-25.0	charcoal		this report
42SA17216	Beta-19285	8100±220	7580 BC–6530 BC	-25.0	charcoal		this report
42SA17215	Beta-16596	8330±110	7580 BC–7075 BC	-25.0	charcoal		this report
42SA21095	Beta-69317	8700±90	8175 BC–7580 BC		charred material		this report
42SA17107	Beta-18737	8340±290	8200 BC–6640 BC	-25.0	charcoal		this report



Figure D-1. Macaw feather apron recovered from Lavender Canyon, Needles District. (Photo courtesy of Edge of the Cedars Museum)

program as outliers. These anomalous dates came from Stratum 11 in the Down Wash site (42WN1666; Horn 1990:53) and a hearth from the Land of Standing Rocks in the Maze District (42WN784; Table D-6). These three oldest dates can be statistically combined to represent the end of the Middle Archaic at 3820 ± 65 BP; 2465–2045 cal BC. The median of this end date for the Middle Archaic is 2275 cal BC. This median date was used in Table 3 for the final chronology of the Canyonlands Archeological Project.

The remaining 59 radiocarbon dates represent the span of the Late Archaic period in the three districts of Canyonlands National Park plus the Orange Cliffs of Glen Canyon National Recreation Area. The calibrated date range for the Late Archaic period begins in 1880–1570 cal BC and ends in cal AD 570–800 (95% probability). The span of this phase, as calculated by the model, is 2200 to 2600 years. The medians from this Bayesian chronological model begin the Late Archaic period at 1715 cal BC and end it at cal AD 670. These ranges (rounded) are listed in Table 3 for the final chronology of the Canyonlands Archeological Project.

Early to Middle Archaic

Eight radiocarbon dates in Table D-5 indicate the Early Archaic occupation of the Needles District began as early as 8000 cal BC and continued intermittently until about 4000 cal BC. With only eight available CRA and with two of them with errors greater than 200 years, the sample size is insufficient to model the thousands of years of the

Table D-6. Selected Radiocarbon Dates from the Maze and Island in the Sky Districts.

Site	Lab Number	CRA (BP)	Unmodeled Cal AD/BC (95%)	d ¹³ C	Material	Site Name	Source
Maze District							
42WN0719	Beta-248932	580±40	AD 1300–1425		corn		NPS files
42WN1949	Beta-58558	720±60	AD 1215–1400		cordage	Gary's Snare Bundle	NPS files
42WN2650	Beta-248925	800±40	AD 1170–1280		corn		NPS files
42WN0719	Beta-248931	880±40	AD 1040–1260		corn		NPS files
42WN2650	Beta-248926	970±40	AD 990–1165		corn		NPS files
42WN0665	Beta-64818	1860±50	AD 30–330		charcoal	Harvest Scene	NPS files
42WN1991	Beta-83758	1990±50	110 BC–AD 205	-21.5	charcoal	Horseshoe hearth	NPS files
42GA3863	Beta-101423	2050±60	345 BC–AD 120	-23.6	charcoal	Doll House No. 3 hearth	NPS files
42WN1990	Beta-83757	2150±80	390 BC–AD 10	-22.1	charcoal	PictoFork hearth	NPS files
42WN1987	Beta-75862	2390±60	760 BC–AD 380	-25.0	charcoal	Wall Campsite hearth	NPS files
42WN0766	Beta-75861	2660±80	1015 BC–545 BC	-25.0	charcoal	Mini-BC Panel	NPS files
42WN0418	AA-8625	3400±65	1885 BC–1530 BC	-26.1	pigment	Great Gallery	NPS files
42WN0784	Beta-47885	3750±90	2460 BC–1940 BC		charcoal	Land of Standing Rocks hearth	NPS files
Island in the Sky District							
42SA00012	Beta-74059	790±60	AD 1045–1385	-25.0	wood	Candlestick Granary	NPS files
42SA00078	Beta-74062	790±60	AD 1045–1385	-25.0	wood	Ft. Bottom Ruin	NPS files
42SA01671	Beta-106094	1070±70	AD 770–1160	-25.0	wood	Wilhite Granary	NPS files
42SA21269	Beta-69321	1910±60	45 BC–245 AD		charcoal	White Crack area	Tipps et al. 1996
42SA21267	Beta-69319	2350±60	750 BC–205 BC		charcoal	White Crack area	Tipps et al. 1996
42SA21291	Beta-69324	2360±60	755 BC–225 BC	-25.0	charcoal	White Crack area	Tipps et al. 1996
42SA21263	Beta-69975	2820±80	1210 BC–815 BC		charcoal	White Crack area	Tipps et al. 1996
42SA21267	Beta-69320	2910±90	1390–845 BC		charcoal	White Crack area	Tipps et al. 1996
42SA21291	Beta-69323	3180±90	1680 BC–1215 BC		charcoal	White Crack area	Tipps et al. 1996
42SA21285	Beta-69322	3410±100	2010 BC–1455 BC		charcoal	White Crack area	Tipps et al. 1996

Early Archaic. But these eight calibrated dates indicate the Needles District was visited by Early Archaic people beginning around 8000 cal BC and the use of the district lasted until about 4000 cal BC.

Additional Radiocarbon Dates from Canyonlands National Park

The Canyonlands Archeological Project provided seven CRA from the White Crack area of the Island in the Sky District (Tipps et al. 1996). These

are tabulated and calibrated in Table D-6 along with several previously unreported CRA from the Island in the Sky and Maze districts. The eight samples from hearths and a pigment sample from sites in the Maze District compliment the 20 Late Archaic dates from the Needles District, indicating a substantial Late Archaic presence on both sides of the Colorado River.

The three Island in the Sky wood samples came from Anasazi sites. The one sample of most inter-

est to park visitors and archeologists is from an interior wood beam supporting the second story in Ft. Bottom Ruin (42SA78). This beam dated to cal AD 1045–1385. While not precise, this date adds another piece of chronological information to the hundreds of late Pueblo II-Pueblo III towers from across the Mesa Verde region and the 40 or so towers documented from southeast Utah (Bredthauer 2010).

Summary

Radiocarbon dating and other archeological evidence demonstrate that prehistoric people intermittently used Canyonlands National Park. The radiocarbon dates and chronological models presented in this appendix indicate that the prehistoric use and occupation of the Needles District was not continuous; rather, there were periods of intense use and occupation followed by periods of almost total abandonment—as measured by a decrease in the number of radiocarbon dates. Most of the radiocarbon dates, and by extension, most of the prehistoric use of the Needles District occurred during the Late Archaic and during Pueblo III.

Bayesian chronological modelling was applied to obtain statistical estimates of the span of occupation during several prehistoric periods or subperiods. The model of the Protohistoric dates from the Needles District showed an occupational span of 75–485 years beginning in the early AD 1300s and ending around AD 1700. The main evidence of Protohistoric peoples was provided by the radiocarbon dates that Kinnear-Ferris and others (2015) provided from the Needles District salt cache. The Protohistoric radiocarbon dates, the Bayesian

chronological model, and the archeological evidence (Appendix B) support an interpretation of limited use of the district during the AD 1400s–1700s, probably by Numic or Athapaskan hunter-gatherers.

The radiocarbon dates, coupled with the archeological record of the Needles District, indicate the major occupation was during the Pueblo III period with the occupation starting in cal AD 1180–1220, and ending in cal AD 1275–1300 (Figure D-2). A Bayesian model of the 54 corn samples showed the same temporal span: from cal AD 1170–1220 to cal AD 1275–1300, with a span of 65–120 years, while the span based on all the Pueblo III samples was 65–115 years.

The availability of the large sample of 54 radiocarbon determinations from corn allowed for a relatively precise determination of the timing and span of corn agriculture in the Needles District. The Bayesian model (Table D-4) identified five corn cobs as outliers: two corn cobs dated to the beginning of the Protohistoric or Pueblo IV period at AD 1300 and three corn cobs dated to Pueblo II period. These three early corn samples were statistically pooled to provide a mean date of cal AD 990–1150. This pooled date falls within the middle-to-late Pueblo II period and provides the earliest evidence of Formative corn farmers in the Needles District.

The other sample that was a statistical outlier to the Pueblo III samples was the squirrel pelt from the exotic scarlet macaw apron from site 42SA16680. The cal AD 1035–1210 date was a statistical outlier, indicating it was made during the

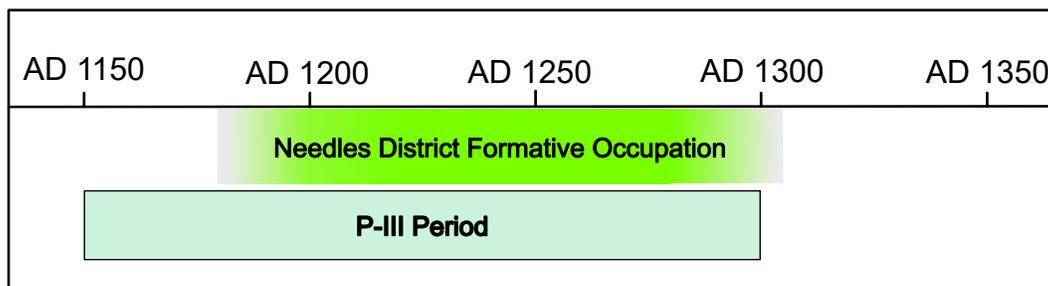


Figure D-2. Date range of Formative occupation in the Needles District.

Pueblo II period but it was probably cached some-time during the Pueblo III occupation of the Needles District.

Finally, the radiocarbon dates were insufficient for a robust statistical model of the thousands of years of the Archaic period, but the two earliest dates indicated that Early Archaic use of the Needles District began at about 8000 cal BC. The late Archaic began at 1880 cal BC and ended around AD 500.

Compared to the rest of the Mesa Verde region, the time span of corn agriculture in the Needles District was relatively short, only 65–120 years. The Bayesian model dated the timing of corn agriculture as beginning in cal AD 1170–1220 and ending in cal AD 1275–1300. Given that most dates of the abandonment of the Mesa Verde region are based on tree-rings, and the actual date of abandonment is assumed to be 20 years or so after the trees were cut, this model of radiocarbon dated corn samples from the Needles District provides a reliable end date for the end of corn agriculture. The agricultural phase ended at or just before cal AD 1300. This ending date of the main Pueblo III

occupation of the Needles District was confirmed by the model identifying two corn dates from the Protohistoric period as statistical outliers. These dates and models suggest that a few people remained in the district at or just after AD 1300, before they emigrated southward.

In summary, the radiocarbon dated organic samples from the Needles District demonstrate sporadic occupation beginning with the Early Archaic (starting at about 8000 cal BC), a substantial Late Archaic occupation from 2005–1345 cal BC to cal AD 350–885, and the major occupation during the Pueblo III period from cal AD 1170–1220 to cal AD 1275–1300. This analysis of radiocarbon dates documents the presence of people in the Needles District for thousands of years, but more high quality CRA with smaller errors would be required to refine the modelling of the periods or subperiods over this long time span.

Acknowledgment. I thank Laura Martin of Canyonlands National Park for sharing radiocarbon dating information from the Needles District.

REFERENCES

- Borson, Nancy, Frances Berdan, Edward Stark, Jack States, and Peter J. Wettstein
1998 Origins of an Anasazi Scarlet Macaw Feather Artifact. *American Antiquity* 63:131–142.
- Bredthauer, Alison Vanessa
2010 *A Towering Enigma: An Examination of Late Pueblo II and Pueblo III Towers in the Northern San Juan Region*. Master's thesis, Department of Anthropology, University of Colorado, Boulder.
- Bronk Ramsey, C.
2009a Bayesian Analysis of Radiocarbon Dates. *Radiocarbon* 51:337–360.
2009b Dealing with Outliers and Offsets in Radiocarbon Dating. *Radiocarbon* 51:1023–1045.
- Buck, Caitlin E, W.G. Cavanagh, and C.D. Litton
2006 *The Bayesian Approach to Interpreting Archaeological Data*. Wiley, Chichester, United Kingdom.
- Bungart, Peter W.
1996 Dating Aceramic Sites in the Orange Cliffs Area. In *Glen Canyon Revisited*, by Phil R. Geib, pp. 126–135. University of Utah Anthropological Papers No. 119. Salt Lake City.

- Chaffee, Scott D., Marian Hyman, Marvin W. Rowe, Nancy J. Coulam, Alan Schroedl, and Kathleen Hogue
 1994 Radiocarbon Dates on the All American Man Pictograph. *American Antiquity* 59:769–781.
- Chandler, Susan
 1990 Limited Excavations at Bighorn Sheep Ruin (42SA1563) Canyonlands National Park, Utah. *Utah Archaeology* 1990 3:85–105.
- Dominguez, Steve
 1994 *Archeological Investigations at Site 42SA20286, Canyonlands National Park, Utah*. Technical Report No. 36. Midwest Archeological Center, National Park Service, Lincoln.
 1999 *Analysis of Archeological Materials from the Needles District Development, Canyonlands National Park*. Technical Report No. 60. Midwest Archeological Center, National Park Service, Lincoln.
- Hargrave, Lyndon L.
 1979 A Macaw Feather Artifact from Southeastern Utah. *Southwestern Lore* 45(4):1–6.
- Hays-Gilpin, Kelley
 2014 Sikyatki Polychrome: Style, Iconography, Cross-Media Comparisons, and Organization of Production. *Kiva* 79:175–204.
- Horn, Jonathon C.
 1990 *Archaeological Data Recovery at the Down Wash Site (42WN1666), Canyonlands National Park, Utah*. Alpine Archaeological Consultants, Inc. Submitted to National Park Service, Rocky Mountain Region, Lakewood.
- Kinnear-Ferris, Sharyl
 2011 *Hopi Pottery in the Southern Utah Canyon County*. Paper presented at the 76th Annual Meeting of the Society for American Archaeology, Sacramento.
- Kinnear-Ferris, Sharyl, Winston Hurst, Kelley A. Hays-Gilpin.
 2015 Hopi Pottery and Prehistoric Salt Procurement in Southern Utah Canyon County. *Kiva* 80:250–280.
- Pierson, Lloyd M.
 1981 *Cultural Resource Summary of the East Central Portion of Moab District, 1980*. Utah Cultural Resource Series No. 10. Bureau of Land Management, Salt Lake City.
- Reed, Alan D.
 1993 *The Archaeology of Shadow Shelter (42SA8477), Canyonlands National Park, Utah*. Alpine Archaeological Consultants, Inc. Montrose, Colorado.
- Reimer, P., Austin, W., Bard, E., Bayliss, A., Blackwell, P., Bronk Ramsey, C., Butzin, M., Cheng, H., Edwards, R., et al.
 2020 The IntCal20 Northern Hemisphere Radiocarbon Age Calibration Curve (0–55 cal kBP). *Radiocarbon* 62:725–757.

Thompson, Richard A.

1978 *A Stratified Random Sample of the Cultural Resources in the Canyonlands Section of the Moab District of the Bureau of Land Management in Eastern Utah*. Cultural Resource Series No. 1. Bureau of Land Management, Salt Lake City.

Tipps, Betsy L.

1995 *Holocene Archeology near Squaw Butte, Canyonlands National Park*. Division of Cultural Resources Selections No. 7. National Park Service, Rocky Mountain Regional Office, Denver.

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*. Division of Cultural Resources Selections No. 1. National Park Service, Rocky Mountain Region, Denver.

Tipps, Betsy L., André D. La Fond, and Robert I. Birnie

1996 *Cultural Resource Investigations near White Crack, Island-in-the-Sky District, Canyonlands National Park, Utah*. Division of Cultural Resources Selections No. 11. National Park Service, Intermountain Region, Denver.

Wilshusen, Richard H.

2018 How Agriculture Took Hold in the Mesa Verde Region: A Review of Research on the Late Basketmaker-Early Pueblo Periods (A.D. 500–920). *Reviews in Colorado Archaeology* 2018 1(4):69–95.

APPENDIX E.

Selected Chipped Stone Artifacts from the Upper Salt Creek Area

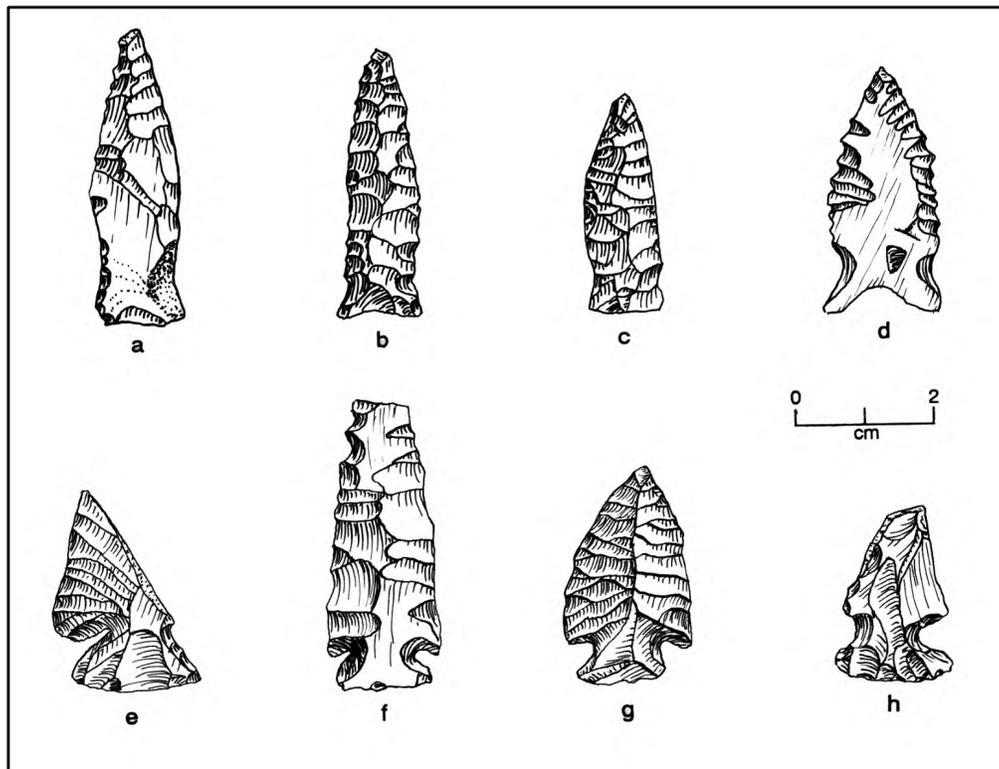


Figure E-1. Selected projectile points. a, Sand Dune Side-notched, site 42SA17215; b, Sand Dune Side-notched, site 42SA17816; c, Sand Dune Side-notched, site 42SA17823; d, Pinto point, site 42SA17768; e, Elko Corner-notched, site 42SA17781; f, Elko Corner-notched, site 42SA17771; g, Elko Corner-notched, site 42SA17216; h, Elko Side-notched, site 42SA21083.

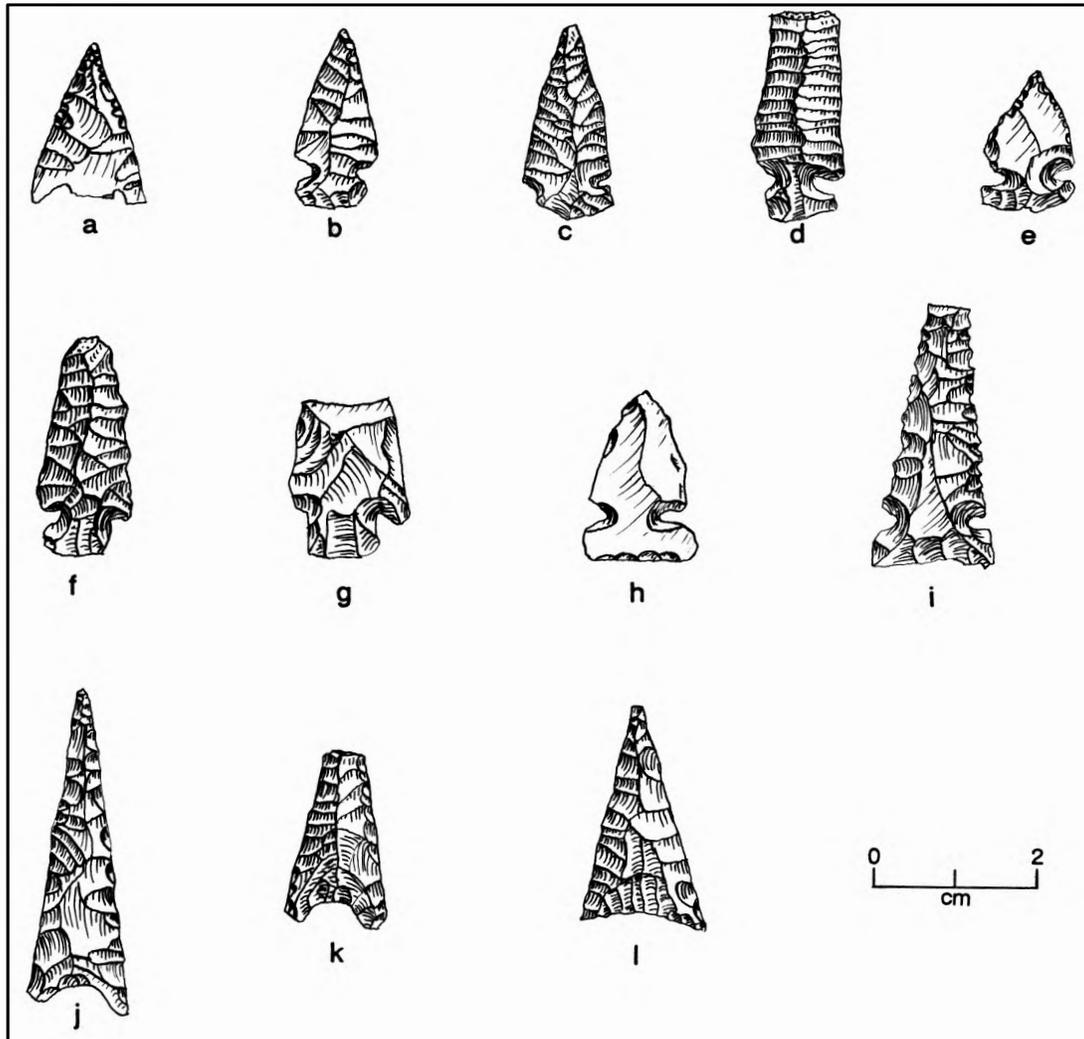


Figure E-2. Selected Formative Period arrow points. a, site 42SA17789; b, site 42SA17764; c, site 42SA1576; d, site 42SA1600; e, site 42SA21120; f, 42SA17799; g, site 42SA17766; h, site 42SA42SA1627; i, site 42SA1601; j, 42SA21120; k, 42SA21127; l, 42SA21125.

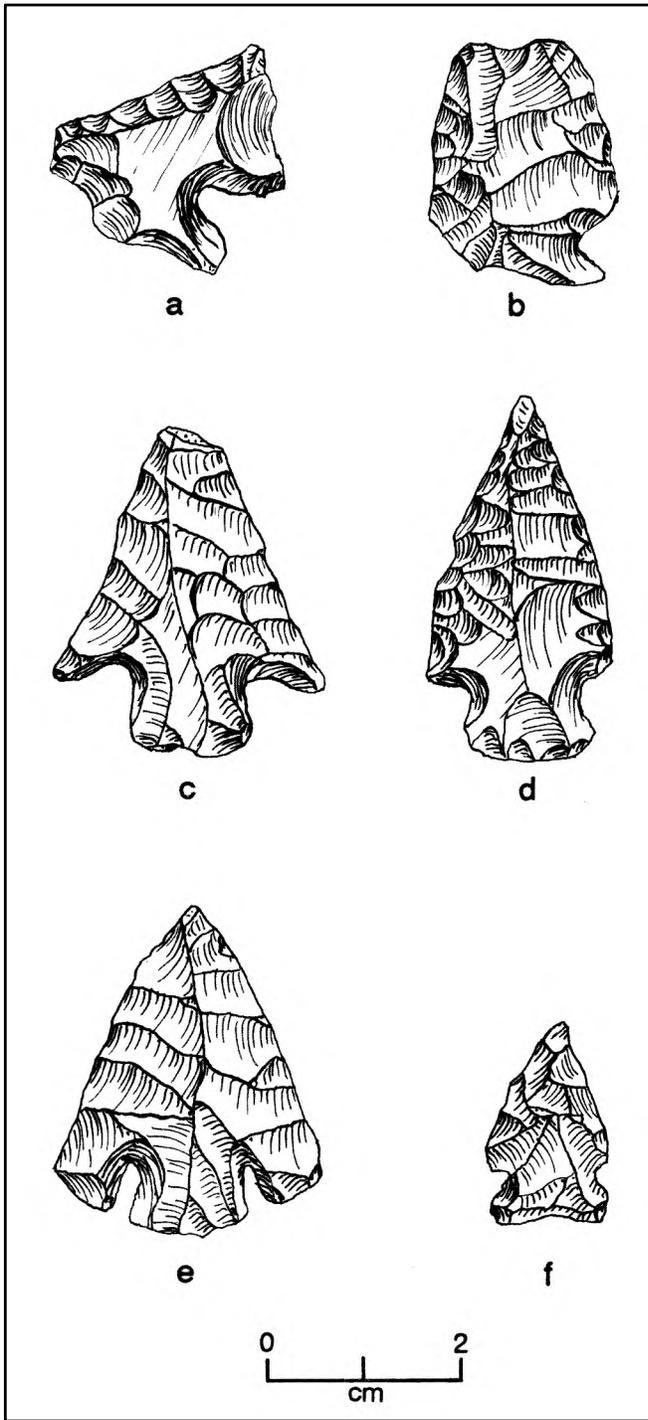


Figure E-3. Selected projectile points. a, site 42SA17771; b, site 42SA21094; c, site 42SA17764; d, site 42SA17774; e, site 42SA17796; f, site 42SA1600.

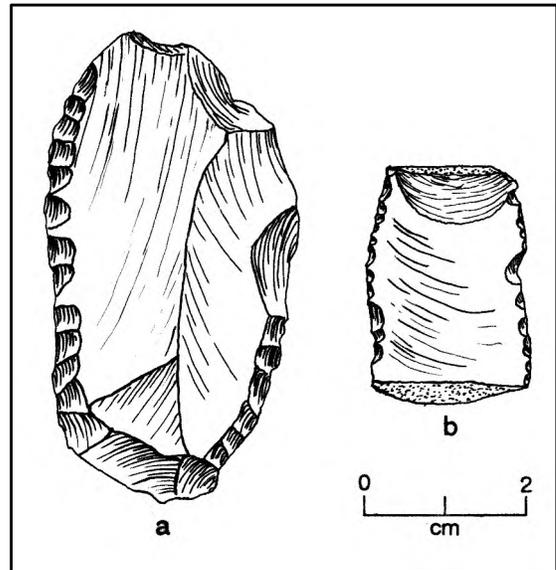


Figure E-4. Selected side scrapers. a, site 42SA17792; b, site 42SA21095.

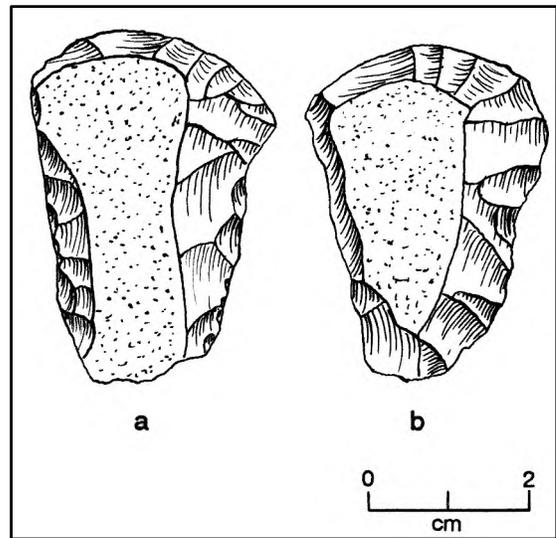


Figure E-5. Selected end scrapers. a, site 42SA17817; b, site 42SA17789.

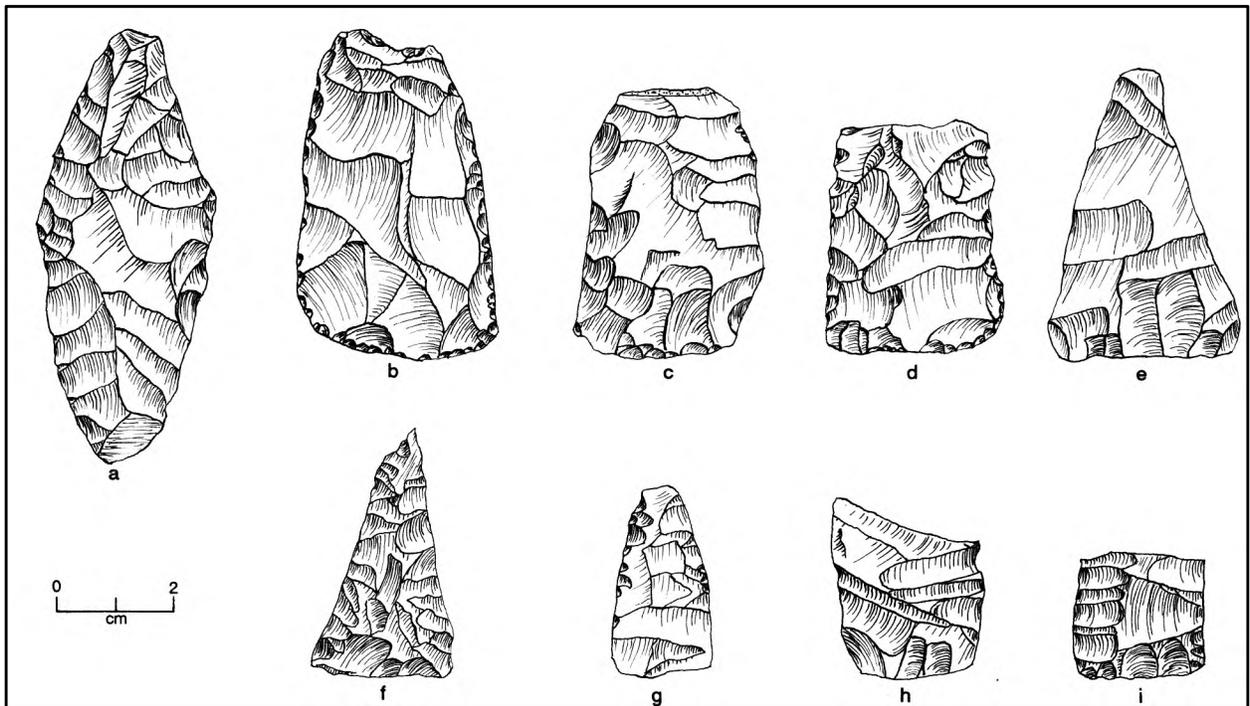


Figure E-6. Selected bifaces. a, site 42SA17790; b, site 42SA17806; c, site 42SA17811; d, site 42SA1585; e, site 42SA17793; f, site 42SA17119; g, site 42SA17811; h, site 42SA17789; i, site 42SA21104.

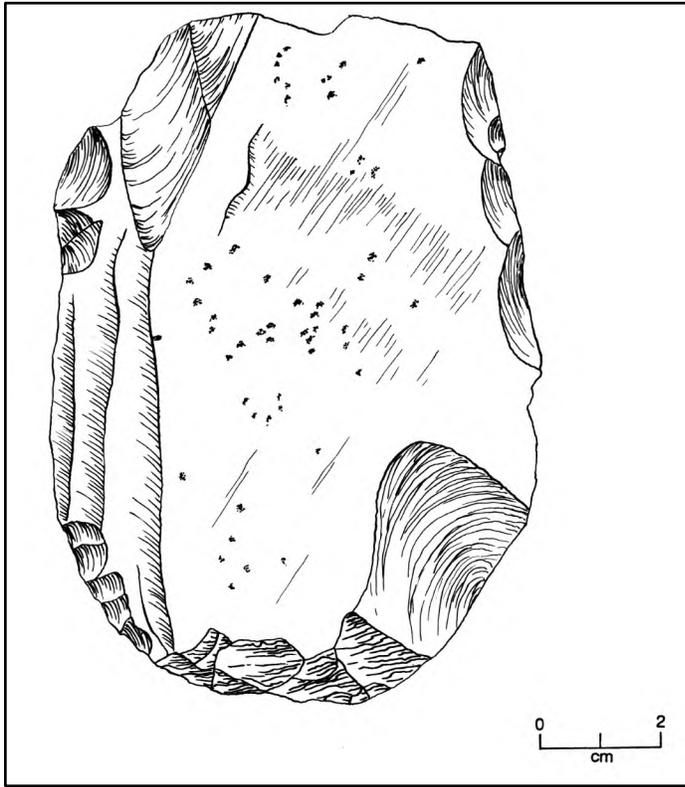


Figure E-7. Chopper. Site 42SA21095.

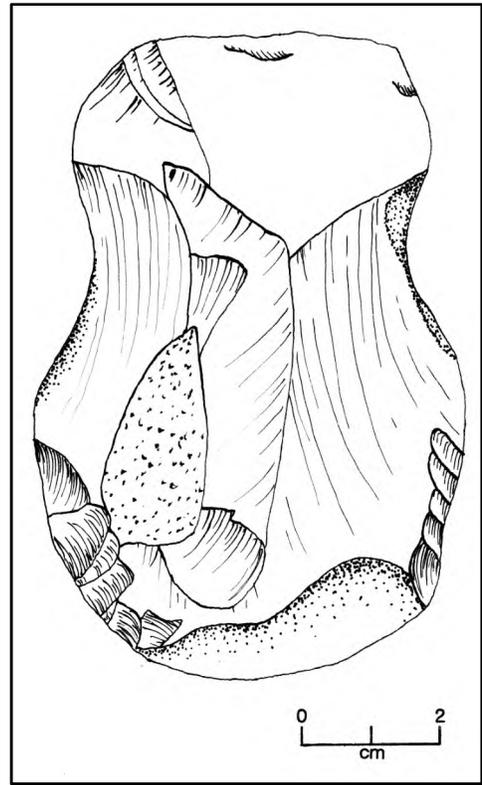


Figure E-8. Axe. Site 42SA17770.

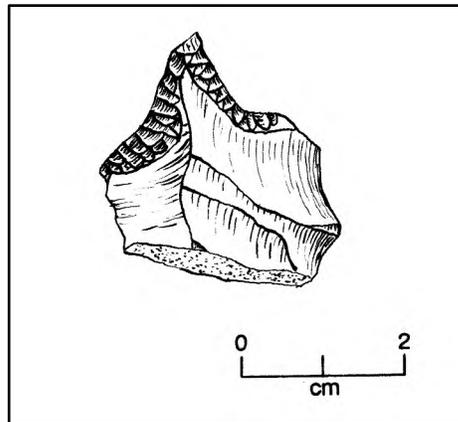


Figure E-9. Graver. Site 42SA17796.

APPENDIX F.

Selected Rock Art Images of Upper Salt Creek Area

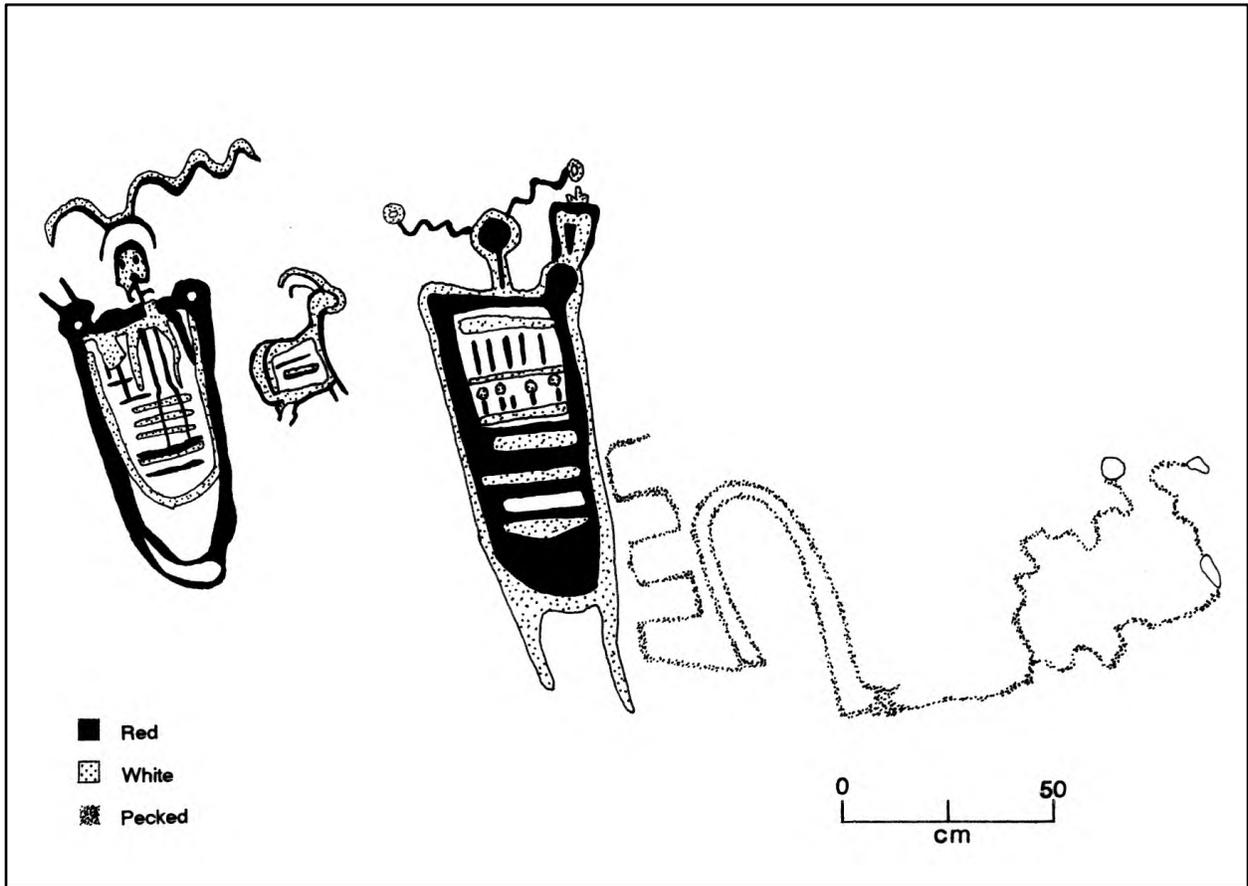


Figure F-1. Rock art, site 42SA1585.

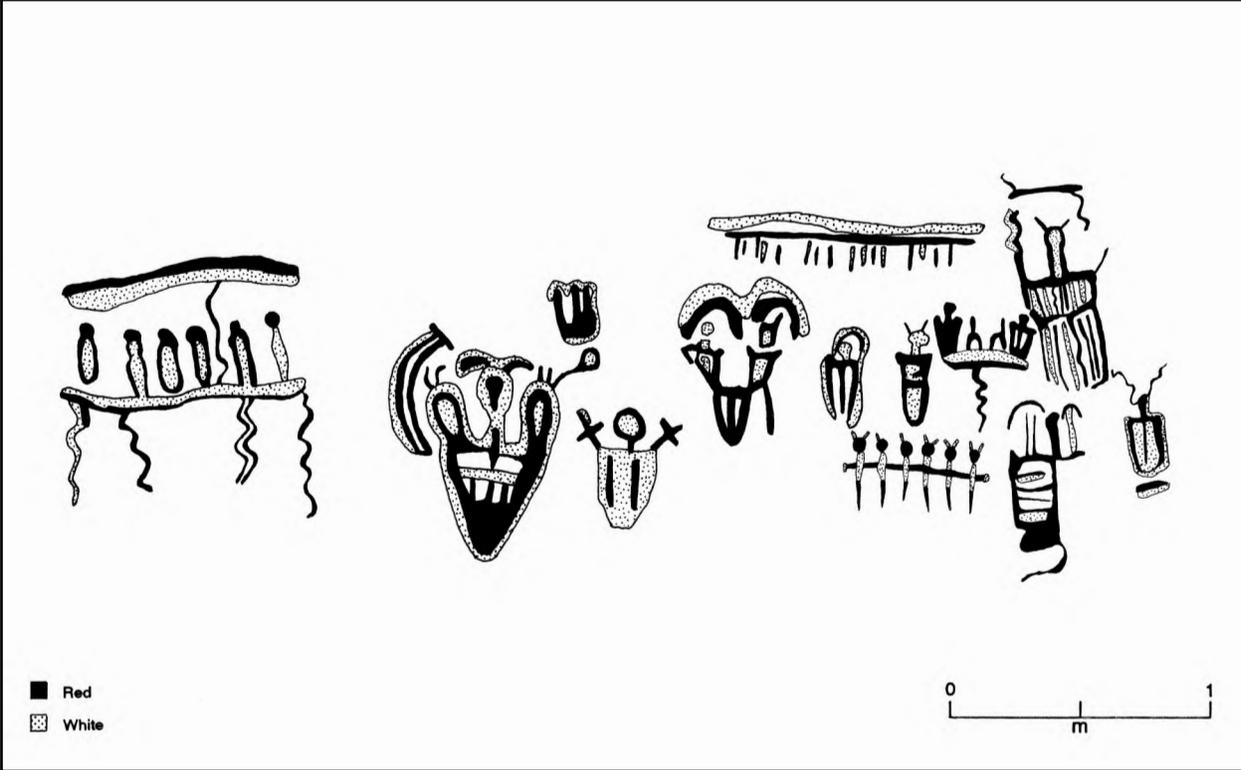


Figure F-2. Rock art, site 42SA1585.

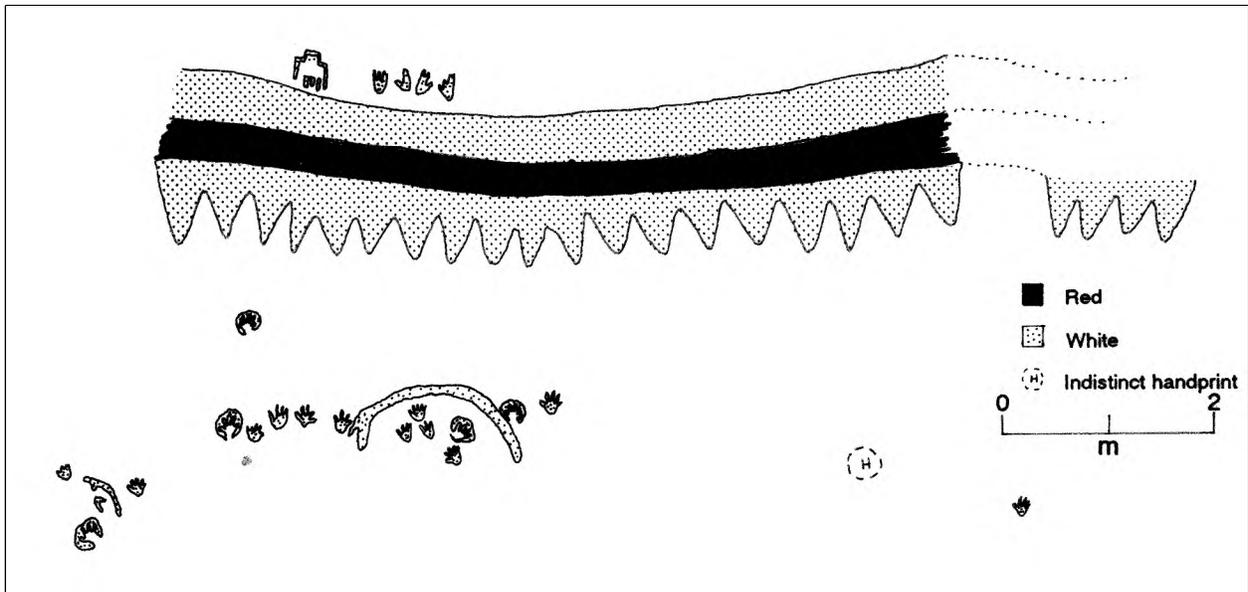


Figure F-3. Rock art, site 42SA17800.

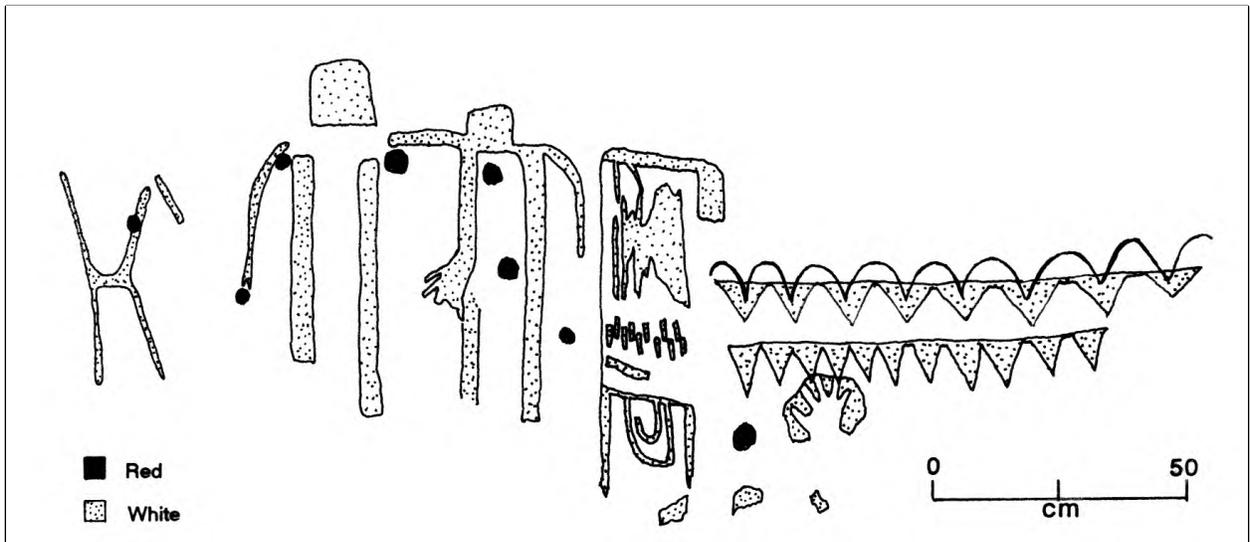


Figure F-4. Rock art, site 42SA1598.

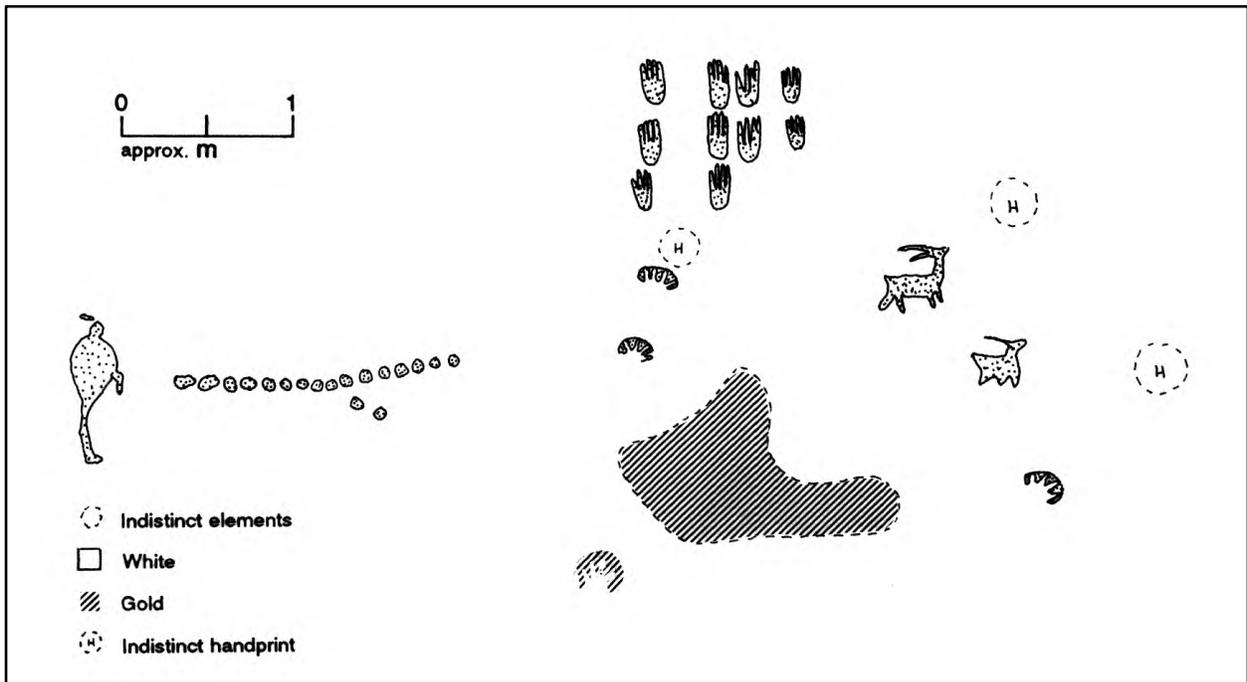


Figure F-5. Rock art, site 42SA21110.

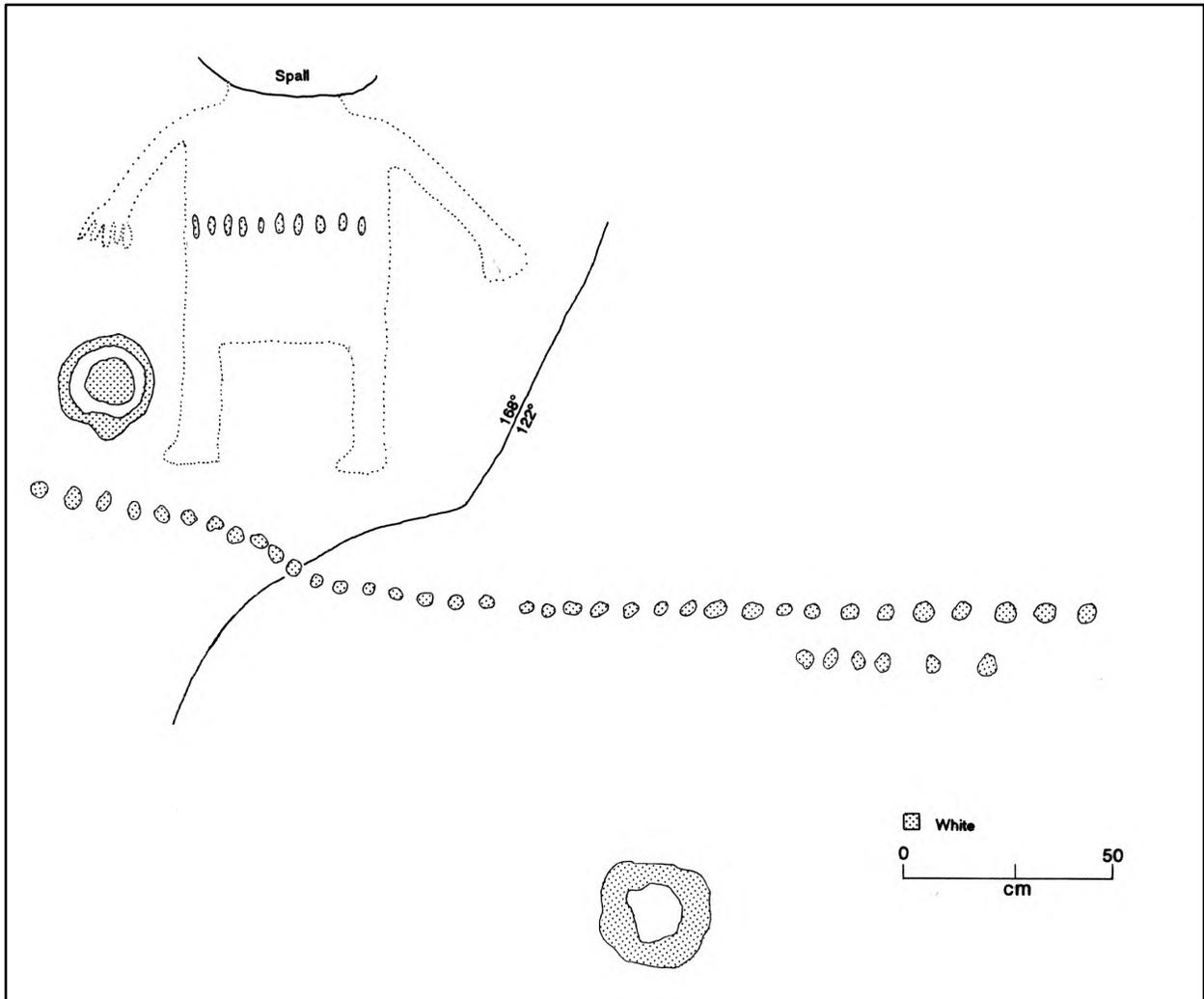


Figure F-6. Rock art, site 42SA17803.

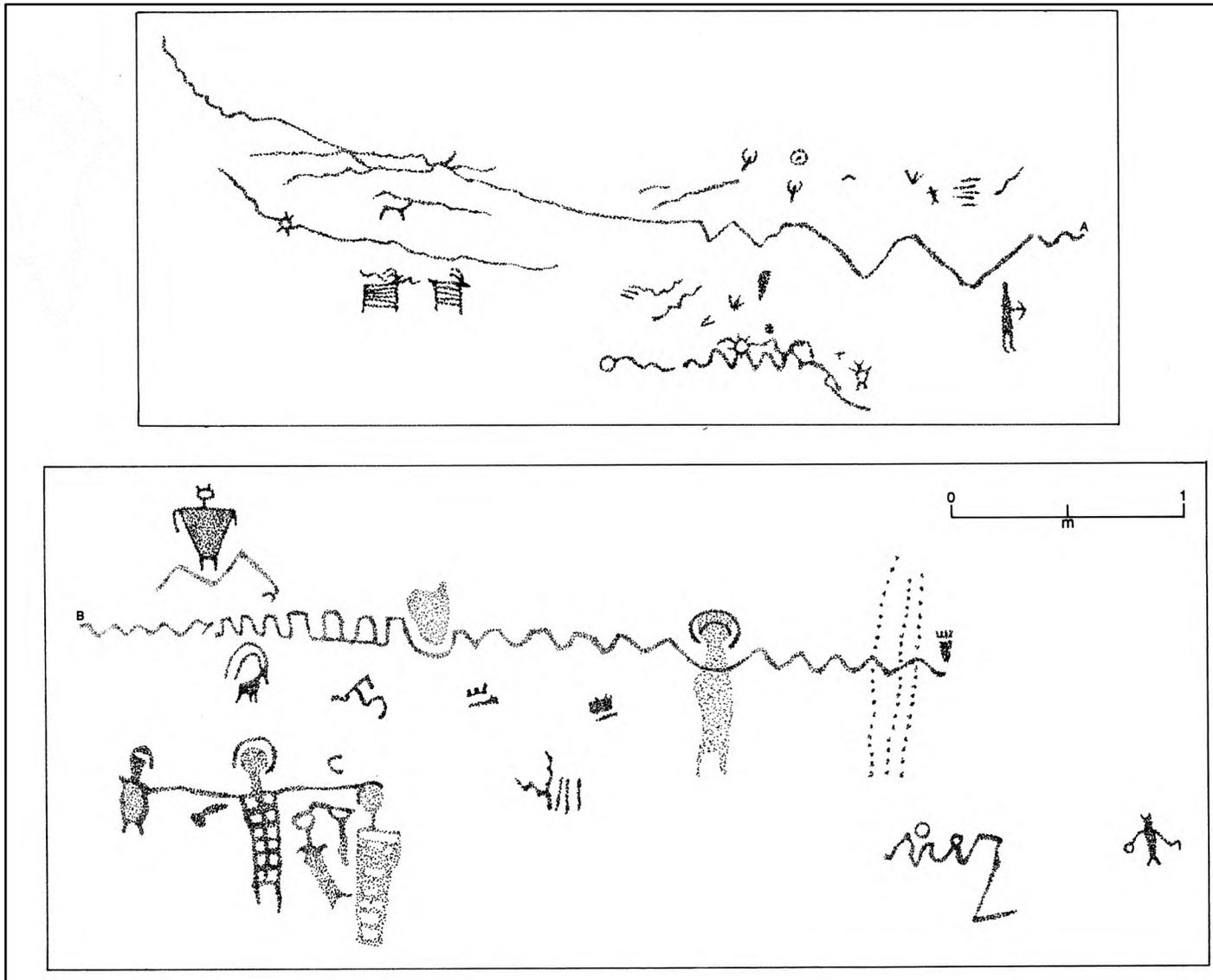


Figure F-7. Rock art, site 42SA1584.

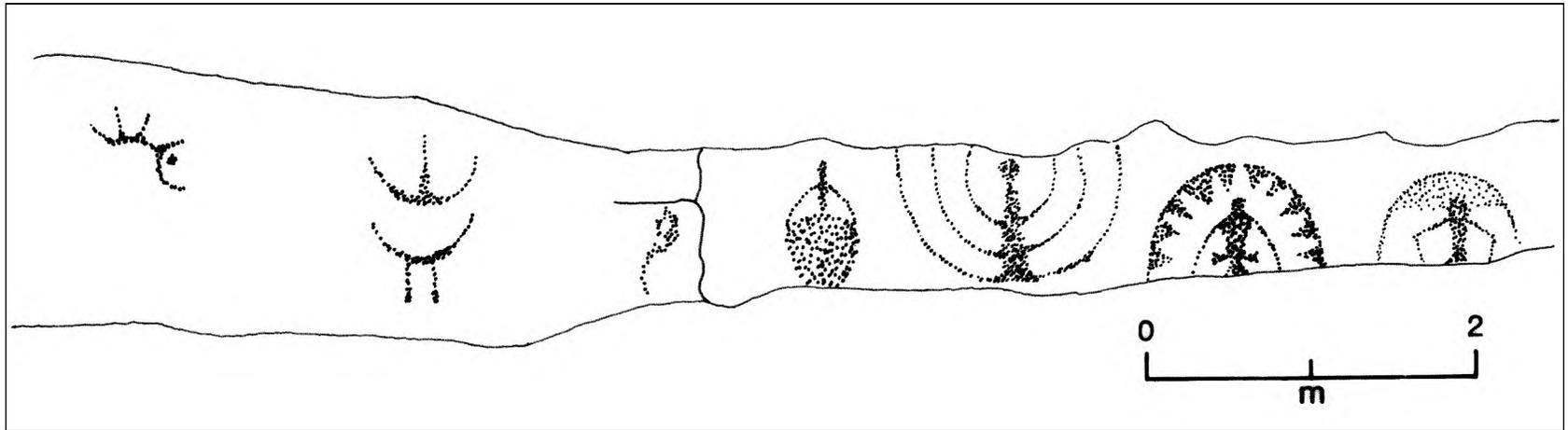


Figure F-8. Rock art, site 42SA21109.

APPENDIX G.

Plan Maps of Selected Sites in the Upper Salt Creek Area

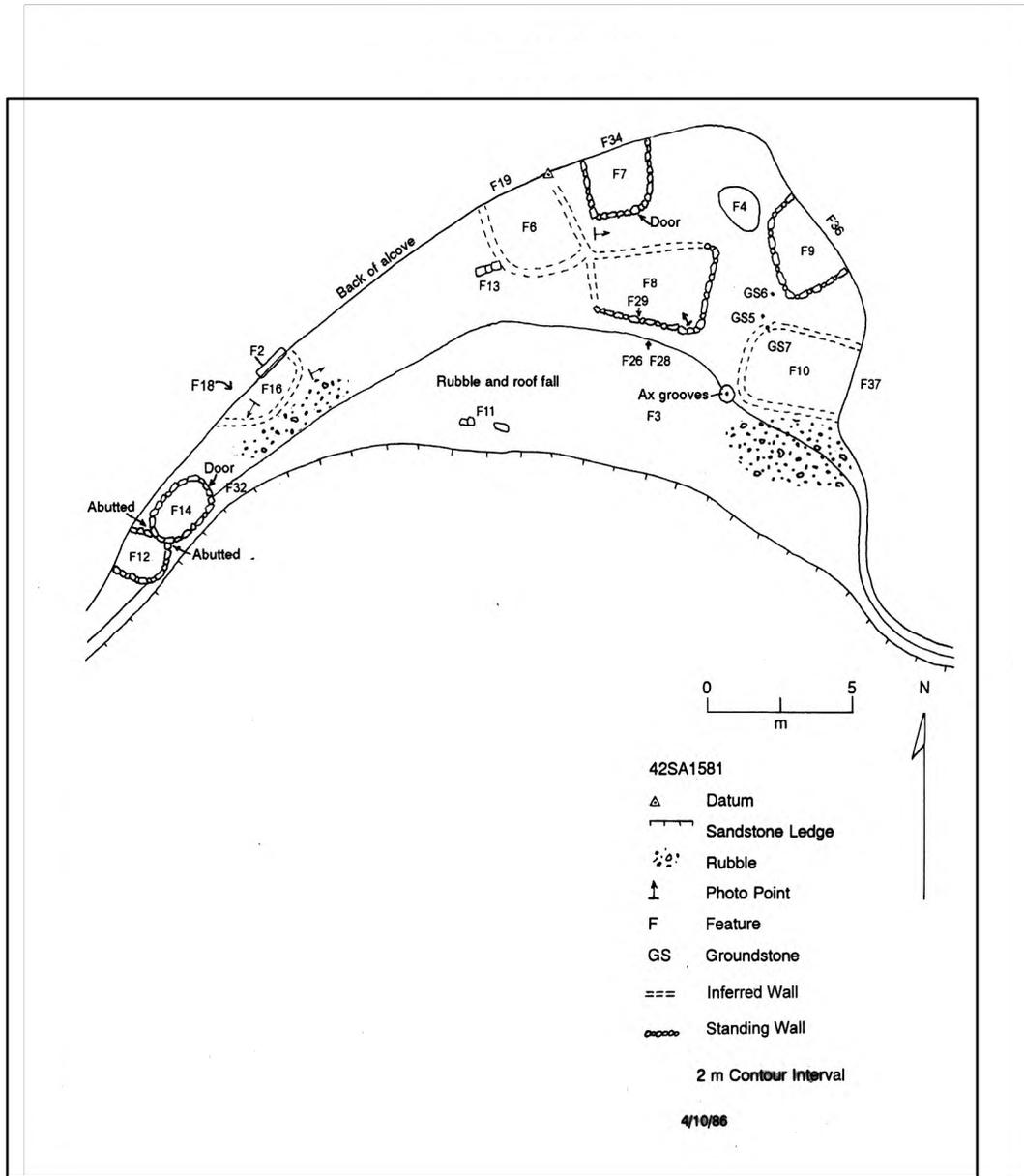


Figure G-1. Plan map, site 42SA1581.

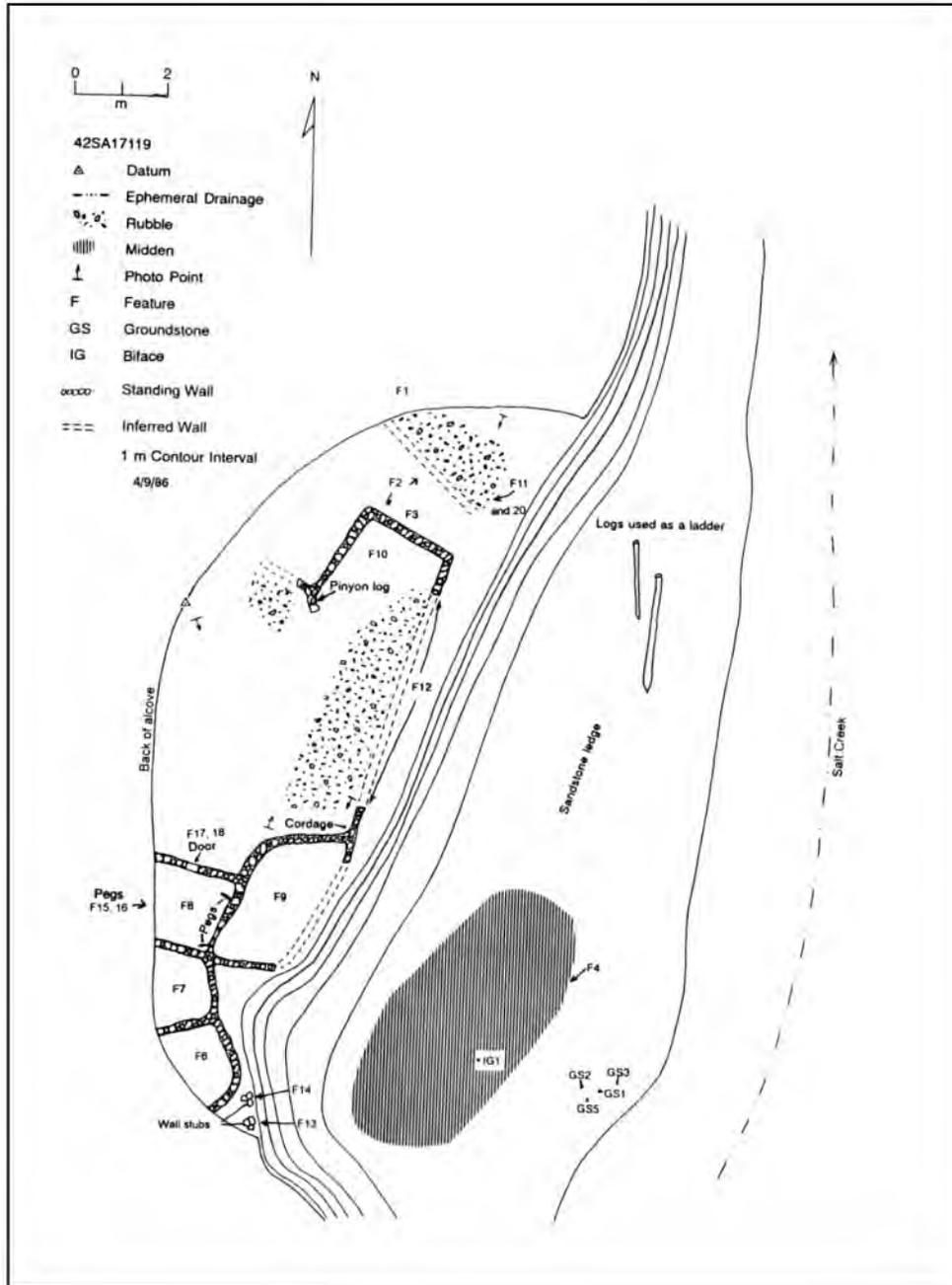


Figure G-2. Plan map, site 42SA17119.

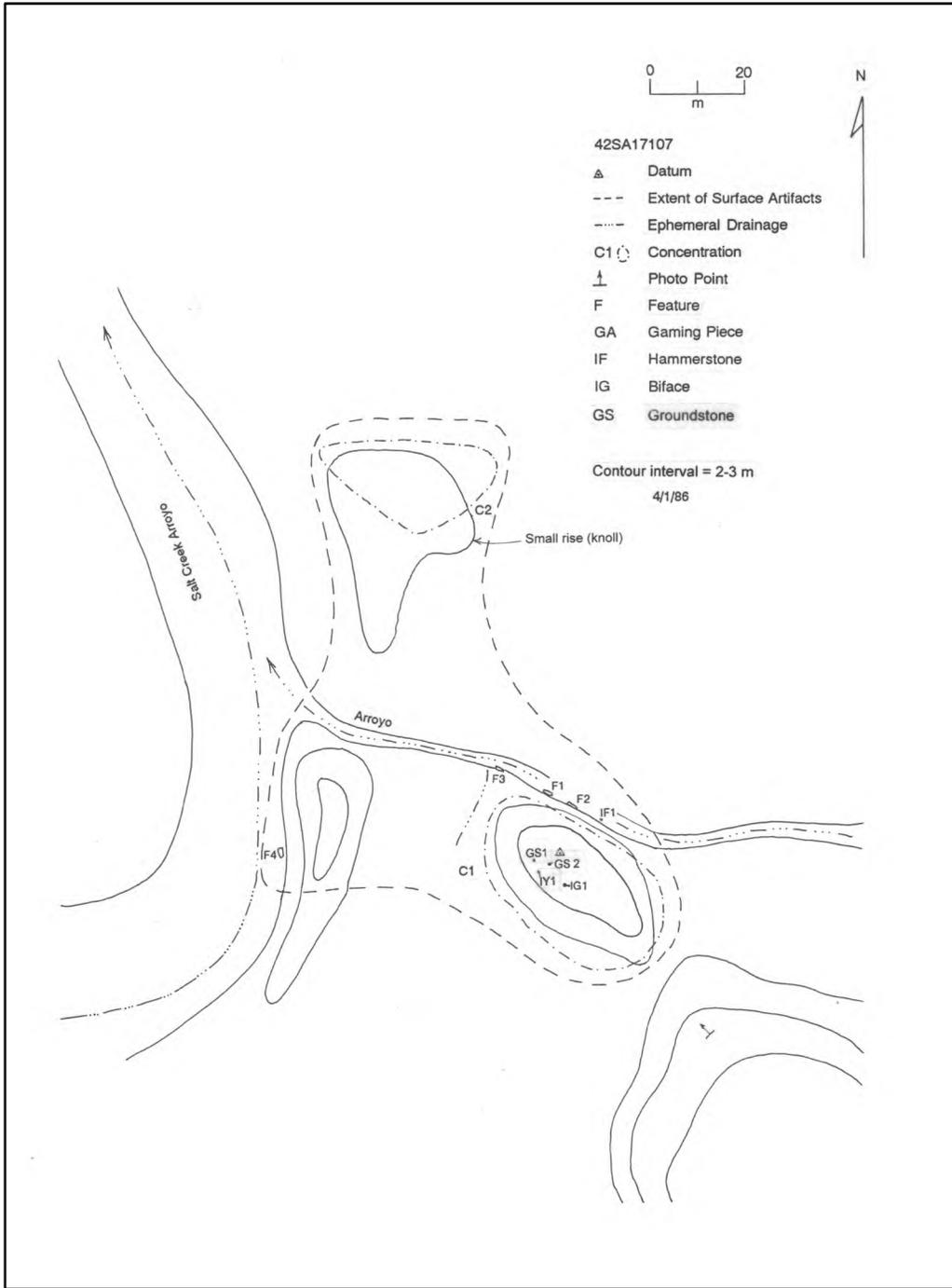


Figure G-3. Plan map, site 42SA17107. Features F1 and F2 (sample combined) dated to 8200–6640 cal BC. Feature F3 is dated to 4945–4550 BC.

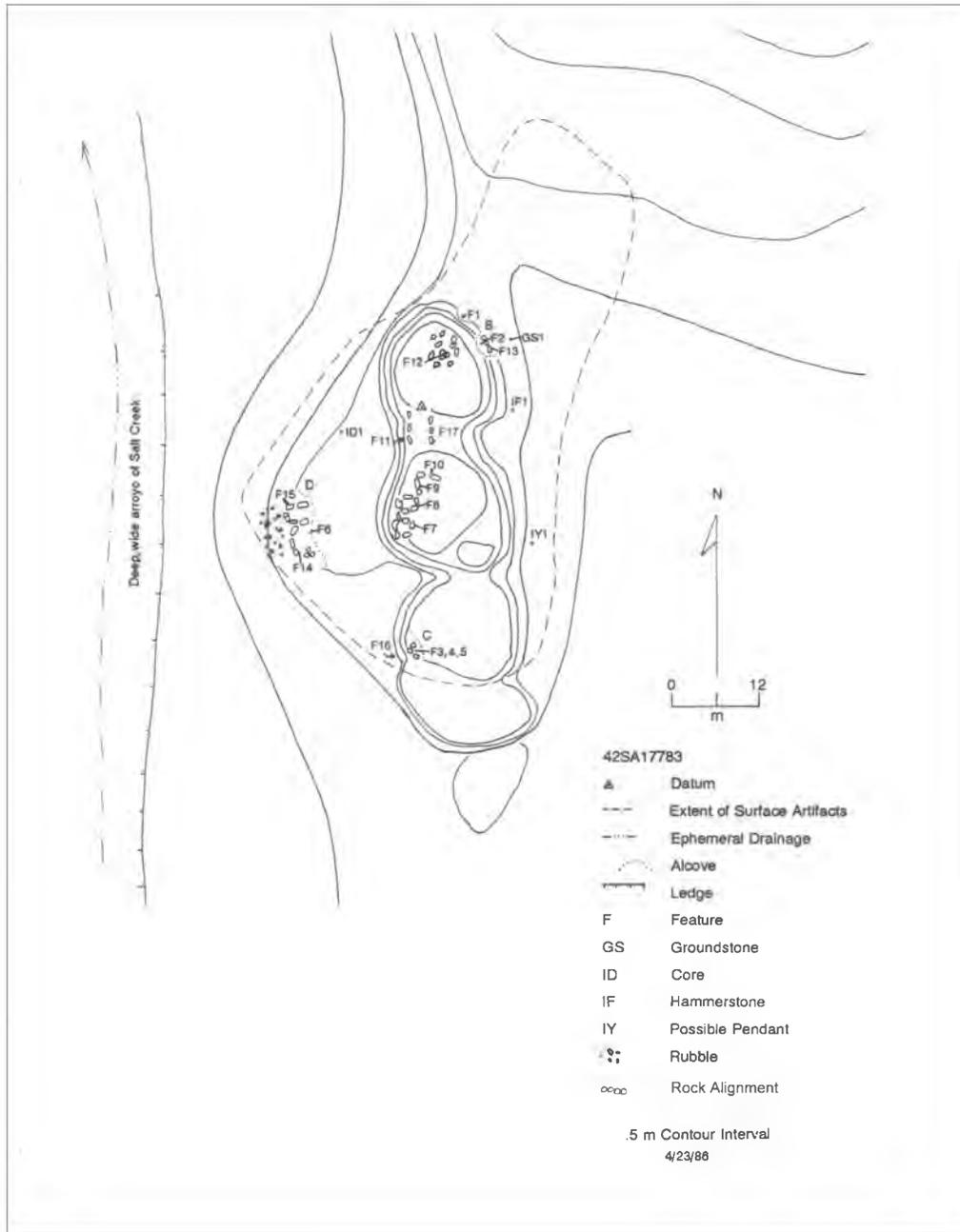


Figure G-4. Plan map, site 42SA17783.

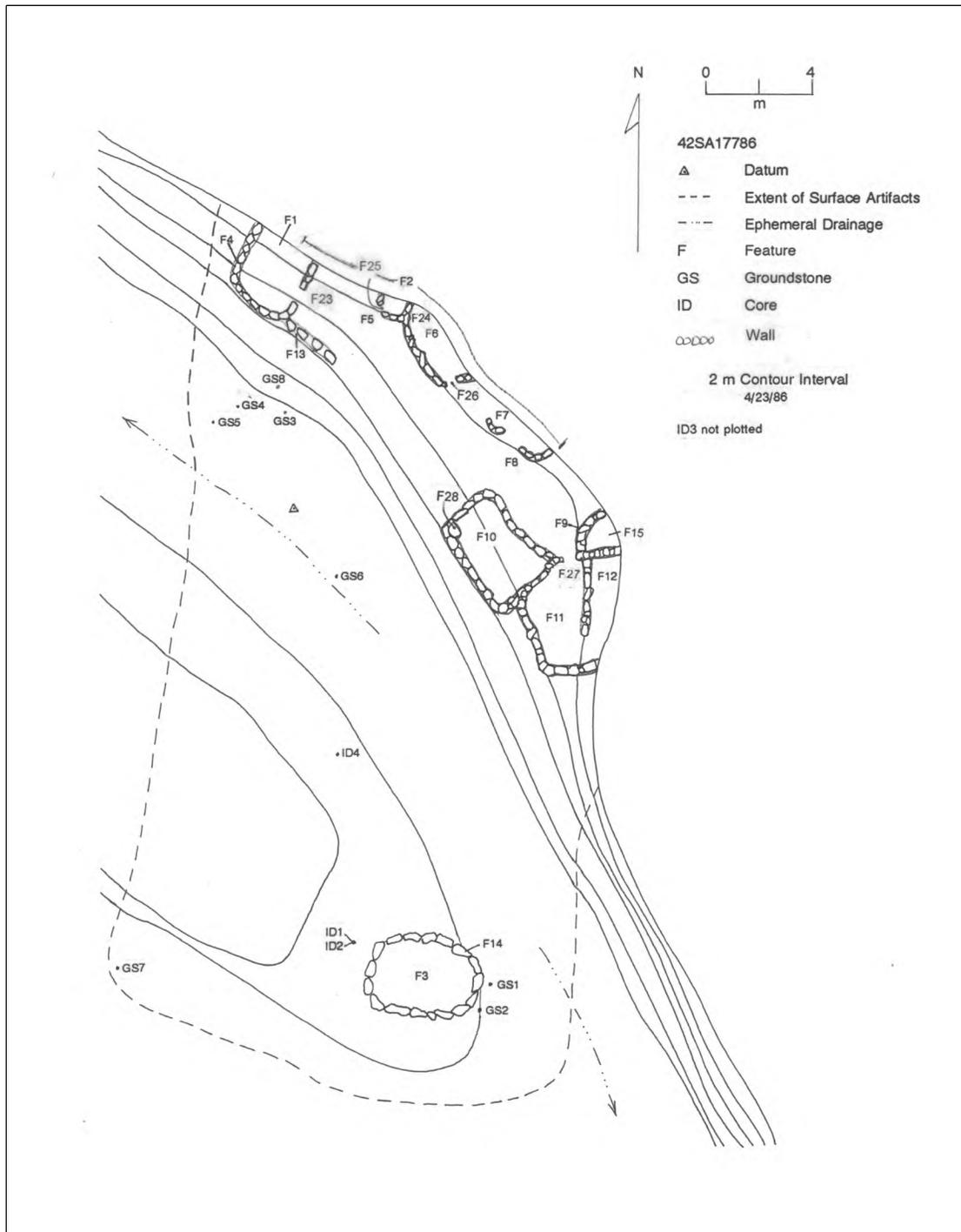


Figure G-5. Plan map, site 42SA17786.

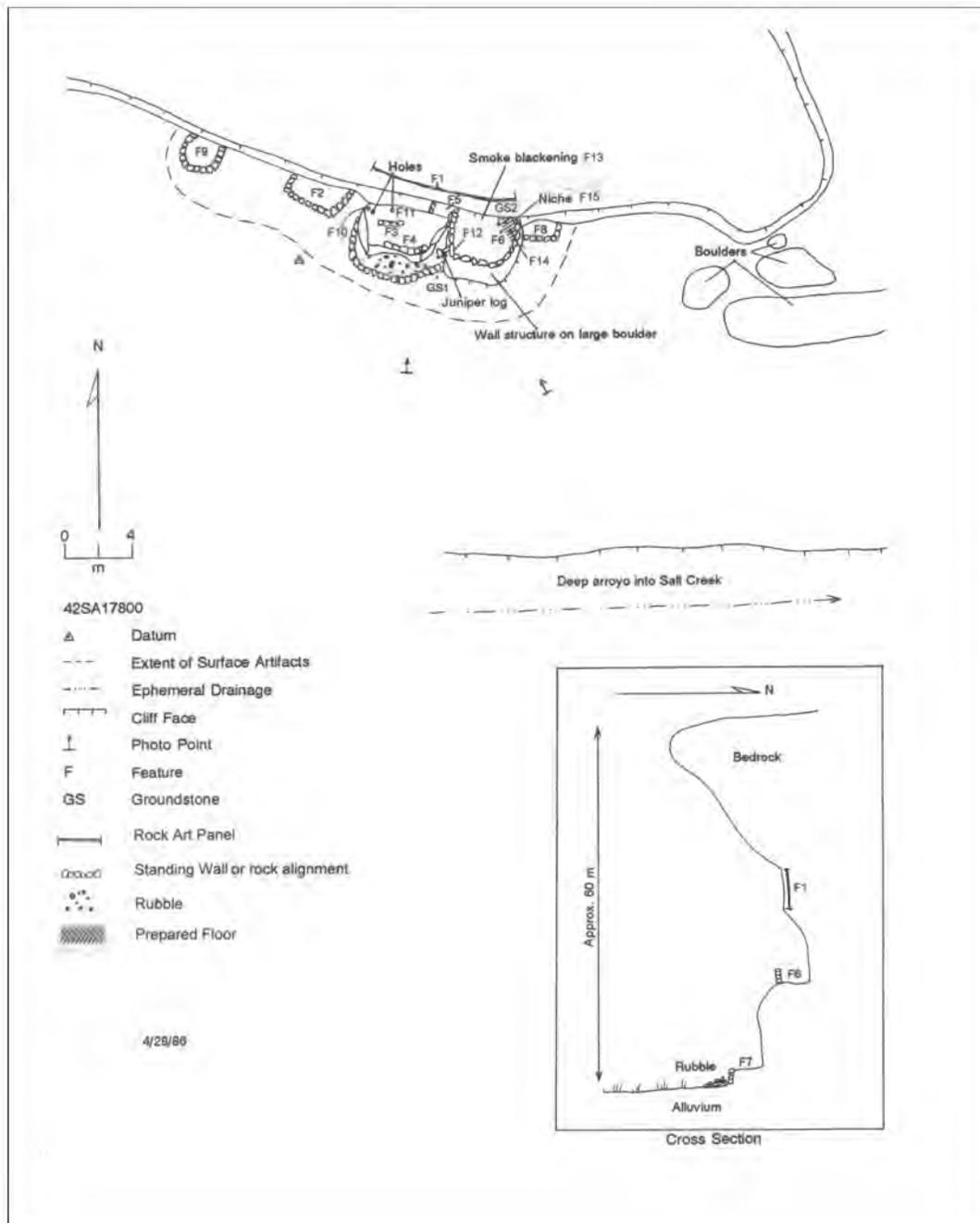


Figure G-6. Plan map, site 42SA17800.

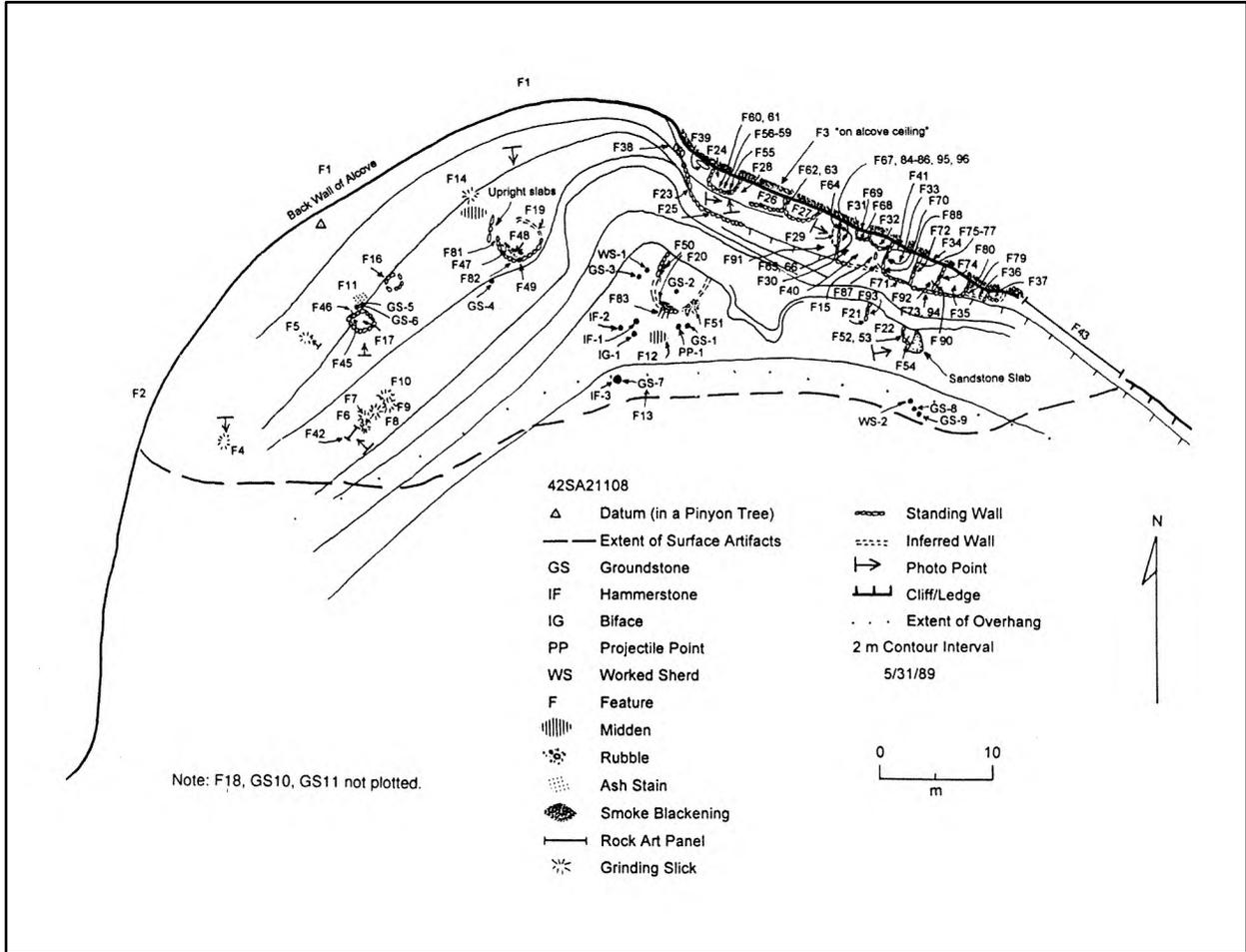


Figure G-7. Plan map, site 42SA21108.

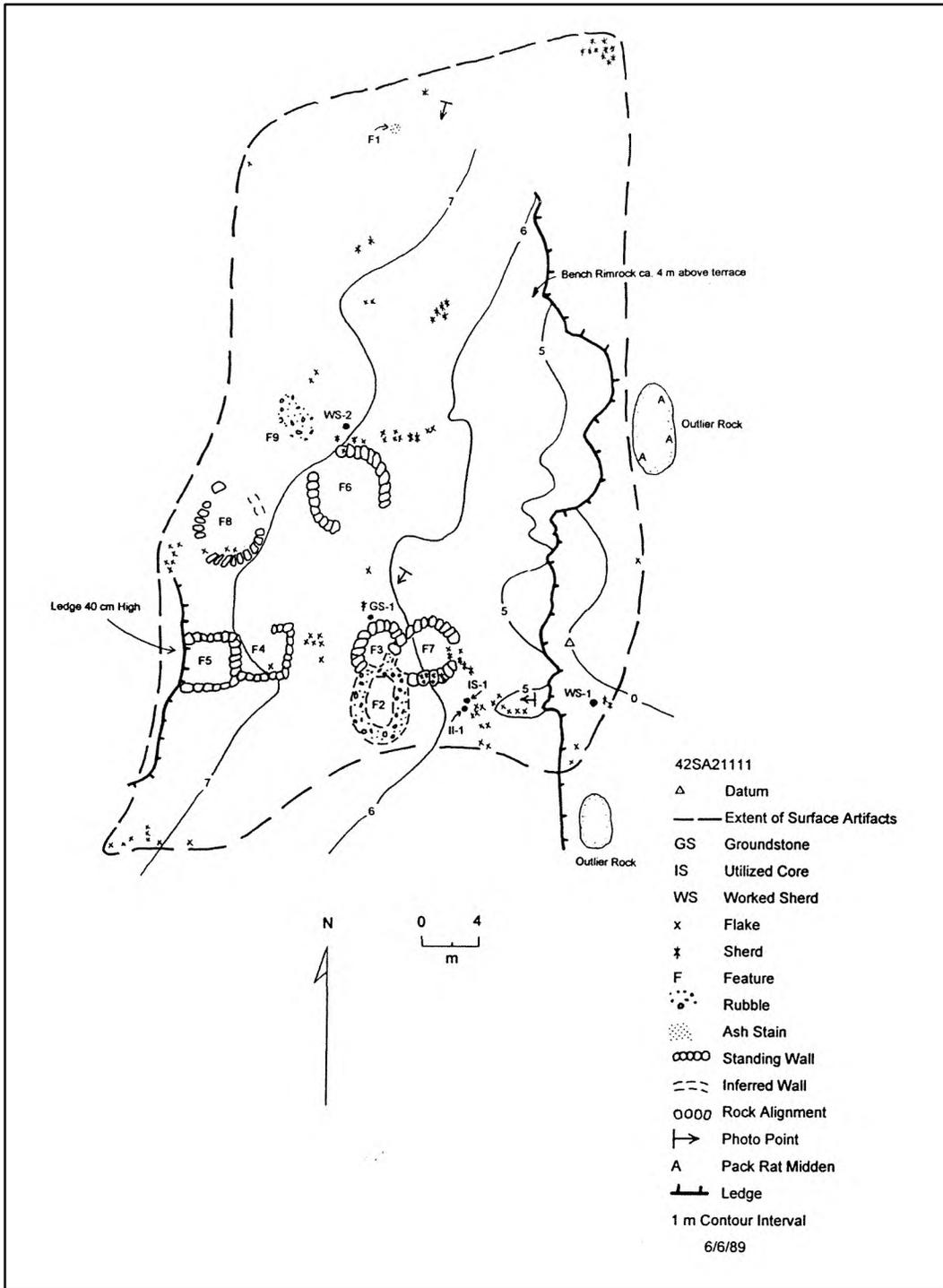


Figure G-8. Plan map, site 42SA21111.

APPENDIX H.

The Peekaboo Basket (42SA20209)

In 1988, park visitors discovered an almost complete prehistoric basket in an overhang near Peekaboo Arch in the Needles District (Figure H-1). On May 21, 1988, crew members from P-III Associates were guided to the location to inspect and conduct an initial assessment of the basket (Figures H-2, H-3). On May 27, 1988, Charles Cartright, Park Archeologist, officially recorded and photographed the site and obtained a trinomial

site number (42SA20209). On July 4, 1988, the basket was removed and is curated at the Western Archeological and Conservation Center. Later, the NPS obtained a radiocarbon determination from the basket at 880 ± 40 BP (Beta-263680), the modeled date range for this basket is AD 1190–1265 (Appendix D).



Figure H-1. Peekaboo basket (42SA20209) in situ before removal in 1988.

CONTINUATION FORM

1051
PAGE

P-III Associates, Inc.

Isolated

Salt Lake City, Utah

Feature No. _____

SITE Basket

DATE 5-21-88

BASKET!

LOCATED ON A HIGH SHELF WITHIN A SALTWATER CLIFF THAT CIRCLES AROUND A BOXED IN DRAINAGE. THE BENCH PROVIDES AN EXCELLENT WALK WAY. THE CLIFF EDGE IS DEFINED BY AN OVERHANG OF ABOUT 4 METERS PROVIDING A SHALLOW AND CONTINUOUS SHELTER CAVE. LOCATED ON THE SOUTH FACE, WEDGED BEHIND SOME CELLING FALL IS A LARGE CONICAL BASKET, QUITE VISIBLE AND EXPOSED.

THE OPENING OF THE BASKET IS APPROX 50 CM IN DIAMETER AND APPROX 45 CM HIGH WITH A BASE OF ABOUT 15 CM. SOME ROCKS (CELLING FALL?) ARE LYING (PLACED) ON THE BASKET PROBABLY ACCOUNTING FOR ITS NOT HAVING BEEN BLOW AWAY.

BASKET CONSTRUCTION IS AS FOLLOWS...

PROBABLE SHAPE:

BROKEN BASKET?



CONICAL

AND IS IN BASICALLY GOOD CONDITION EXCEPT THE BASE IS TORN OUT. NO RECONSTRUCTION IS VISIBLE BASKET SPACES ITS CIRCUMFERENCE WITH A PACK RAT MOUND AND IS INDEED FULL OF RAT SCAT.

I SUSPECT THAT IT CAN BE REMOVED AND WITH PROPER CAUTION, PRESERVED. HOWEVER IT IS A RATHER STRENUOUS WALK OUT AND CARRYING THE BASKET OUT MIGHT PROVE TRICKY. ACCESS VIA SALT CREEK.

I WOULD RECOMMEND COLLECTION DUE TO PROXIMITY TO PEER-A-BO TRAIL ACROSS THE CANYON. I BELIEVE BASKET CAN BE EXTRACTED WITH MINIMAL DAMAGE BUT SPECIAL PRECAUTIONS WILL NEED TO BE TAKEN. BASKET WAS FOUND BY DONNIE & HER DAUGHTER BECKY DURING A DAY HIKE FROM PEER-A-BOO CAMP WHO NOTIFIED NPS PEOPLE AND LED US TO BASKET.

AN INTERESTING SHELTER CAVE WITH POORLY PRESERVED MAIONNAISE ARCHITECTURE IS BETWEEN SALT CREEK AND BASKET SITE. ~~SOME DEBRIS IS AMONG~~ PLASTER IS EQUIVOCAL. STRUCTURE IS INTERESTING AS IT CONTAINS ONE LARGE ROOM AND 3 SMALL (CA 1 m²) "ROOMS" THAT ARE POSS STORAGE CUTS. NUMEROUS SHARDS FOUND IN YRBA INCLUDING BLACK ON GREY, CORRUPTED AND PLAIN WARES.

WOULD RECOMMEND AN INTENSE SURVEY OF THIS CANYON! OVER

FINAL SHEET YES NO

RECORDER ELASKOVICH

TAKEN TO KEEP IT FROM BREAKING AS IT IS EXTREMELY FRAGILE

Figure H-2. Field notes Peekaboo basket (42SA20209), 1988. Page 1.

CONTINUATION FORM

The basket is extremely fragile + will probably break if it is transported without special precautions. Perhaps a museum curator should be contacted about appropriate preservation. At the very least, the collectors should come prepared with a soft, flexible packing material that will not attach itself to the basket (e.g. no cotton) so that the basket can be packed (perhaps tissue + styrofoam pellets). Then it should be packed in a rigid container for transport... it would help if the container had handles as the route we took into the site is vertical + requires climbing steep slickrock. We took some color photos but BW should be taken.

TIPPS

Figure H-3. Field notes Peekaboo basket (42SA20209), 1988. Page 2.



Figure H-4. Peekaboo basket (42SA20209), cover slabs removed, 1988.

APPENDIX I.

Stone Circles in the Needles District, Canyonlands National Park

In 1987, P-III Associates received a request from Linda Honeycutt at Woods Canyon Archaeological Consultants, Inc. regarding information about the presence of stone circles and stone rectangles in southeastern Utah (Figures I-1–3). Gary M. Brown, Staff Archeologist at P-III Associates at the time, responded (Figure I-4) about the presence of such sites in the Upper Salt Creek Area.

Several sites with stone circles (and some with stone rectangles) were recorded during the Canyonlands Archeological Project in the Upper Salt Creek Area, 42SA1594, 42SA17764, 42SA17769, 42SA17771 and 42SA71183, among others. They appear to date the Pueblo III period, the major period of occupation in the area. Some were recorded as isolated non-architectural features, others were recorded in association with limited activity areas, and some sites exhibited several of these features. These stone circles (and rectangular features) were only a couple of meters in diameter, usually only 1-3 courses high and most often found on sandstone knobs and prominences. Although artifacts were occasionally associated with these features, they did not represent habitation structures.

For example, site 42SA1594 (Figure I-5, I-6) is a limited activity site that was originally recorded by Sharrock in 1966 under an eroding sandstone

knob with two possible storage features and a white anthropomorphic pictograph. While being transported into Salt Creek by helicopter, the crew noticed stone circles on some inaccessible sandstone knobs including site 42S1594. Rerecording this site in 1988, the crew amended the site form to include the inaccessible stone circles on the top of the mushroom-shaped outcrop, some 60 feet above the canyon bottom at this site. Figures I-7 and I-8 depicts stone rings from sites 42SA17764 and 42SA17769, respectively.

While Honeycutt and Brown discuss the possible functions of these features, it does not seem likely they were used for signaling or defense. By the time of the Canyonlands Archeological Project there was a growing awareness of small sites with circular stone features associated with Puebloan Chaco roads culminating with our current understanding that these were shrines or herraduras (Van Dyke 2018).

Ortman (2008:138) describes these shrine features in the Castle Rock community in southwestern Colorado. The function of these features at Pueblo III Anasazi sites in the Upper Salt Creek Area is unknown at this time, but is likely to represent another architectural trait tying the Anasazi people of this area and time period with the Four Corners area.

REFERENCES

Ortman, Scott G.

2008 Action, Place, and Space in the Castle Rock Community. In *The Social Construction of Communities. Agency, Structure, and Identity in the Prehispanic Southwest*, edited by Mark D. Varien and James M. Potter, pp. 125–154. Archaeology in Society Series, Series Editor Ian Hodder and Robert W. Preucel. Altamira Press, Rowman and Littlefield Publishers, Inc., New York.

Van Dyke, Ruth M., R. Kyle Bocinsky, Thomas C. Windes, and Tucker J. Robinson

2018 Great Houses, Shrines, and High Places: Intervisibility in the Chacoan World. *American Antiquity* 81:205–230.

Woods Canyon Archaeological Consultants, Inc.

P.O. Box 253
Yellow Jacket, Colorado 81335
(303) 562-4884

December 16, 1987

Dear Colleague,

I am writing to ask you for any information you may have regarding two site types which we encountered during survey in Woodenshoe Canyon, southeast Utah. For want of better terms, we are calling these site types "stone circles" and "stone rectangles". Enclosed are site maps of two such structures to accompany the following descriptions.

By "stone circle" we are referring to a site which contains a circular arrangement of sandstone rocks about 4-6 meters in diameter. The rocks are usually pretty big (up to 30 cm wide by 70 cm high by 20 cm thick) and are either set upright on end or horizontally coursed 2-5 courses high. The absence or paucity of surrounding rubble suggests to us that these structures had only low masonry walls; if they had walls and roofs, these must have been made of wood. The most striking thing about these stone circles is their consistent siting on promontory locations - on the top of an isolated butte or on a terrace edge which juts out from the canyon wall. It seems to us that these sites are purposely placed to afford the best possible view up and down and across the canyon. As a result of this type of placement, the stone circles are usually on thin soils or bedrock. A stone circle may be an isolated structure (with or without artifacts) or it may be associated with a Pueblo III habitation site.

By "stone rectangle" we are referring to a site which contains a rectangular stone structure measuring 3-5 meters wide by 4-11 meters long. The building stones are usually large unshaped sandstone or limestone blocks or slabs, horizontally coursed up to about 7 courses high. These structures are not easily confused with habitation-type roomblocks, as stone rectangles clearly lack any interior rubble fill or interior dividing walls. The stone rectangles share a number of characteristics with the stone circles. They lack any appreciable amount of surrounding rubble, which suggests that the masonry walls were always low and that the rectangle either lacked a superstructure or had one made of wood. They are situated on promontory

Figure I-1. Letter from Linda Honeycutt to P-III Associates, Inc., (page 1 of 4)

locations on the edges of terraces which jut out into the canyon. These locations offer excellent visibility up, down, and across the canyon. Stone rectangles are usually on thin soils or bedrock, due to their situation on the edge of a rock-rimmed terrace. These structures may be either isolated (with few or no artifacts) or associated with Pueblo III habitation sites.

Based on their unusual architecture and striking locations, we suspect that these sites may have formed some type of communication or ceremonial system within Woodenshoe Canyon during the late Pueblo III period. It appears that these sites can be connected by line-of-sight. The mean distance between any nearest two sites is about 800 meters.

The stone circles in Woodenshoe are similar to stone circles we have seen on the Yellow Jacket Ruin, in Yellow Jacket Canyon, on the Coal Bed Canyon site, and on Mockingbird Mesa. They are similar to stone circles found at Chaco Canyon as described by Windes (1978:58). The stone rectangles in Woodenshoe are similar to stone rectangles we have seen on Mockingbird Mesa, and are similar to those described for Wetherill Mesa (Hayes 1964:114) and possibly Chaco Canyon (Kincaid et al 1983:9-20, 21).

Now, the question is, have you ever seen any such structures, and if so, would you please tell us where they were and what you think of them? We are kind of attached to our current theory of a ceremonial or communication system, but we are sure open to hearing any new ideas as to what these sites might really be or how they might have functioned.

Thanks in advance for any input you have into this question. Hope to hear from you soon!

Sincerely,



Linda Honeycutt

encl.



Figure I-2. Letter from Linda Honeycutt to P-III Associates, Inc., (page 2 of 4)

42SA18772

G. Ives 9/8/87

0 10
meters

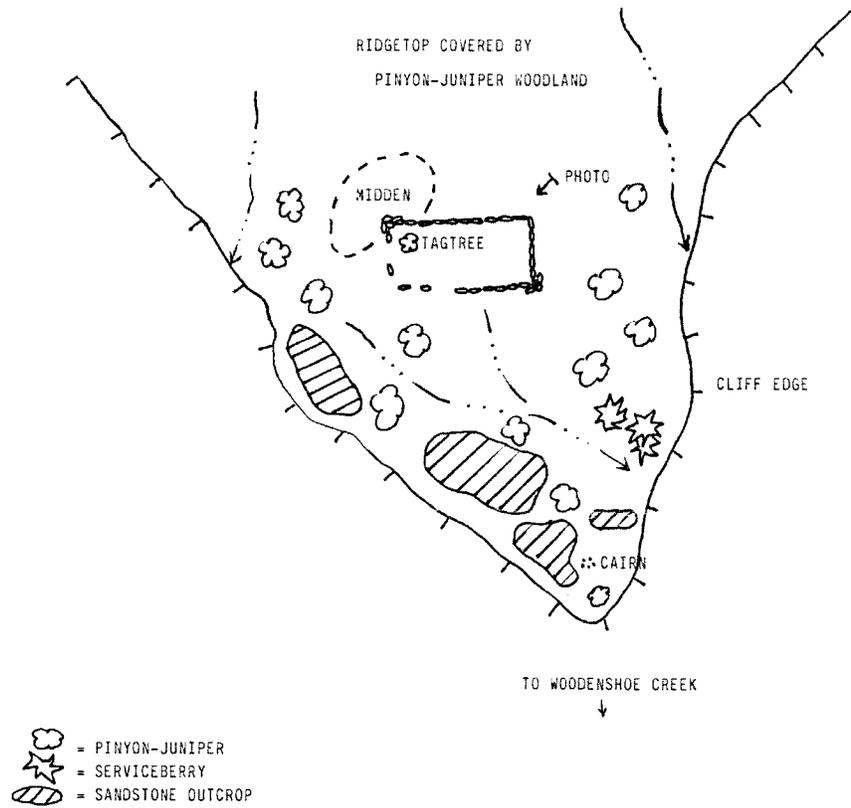


Figure I-3. Letter from Linda Honeycutt to P-III Associates, Inc. (page 3 of 4).

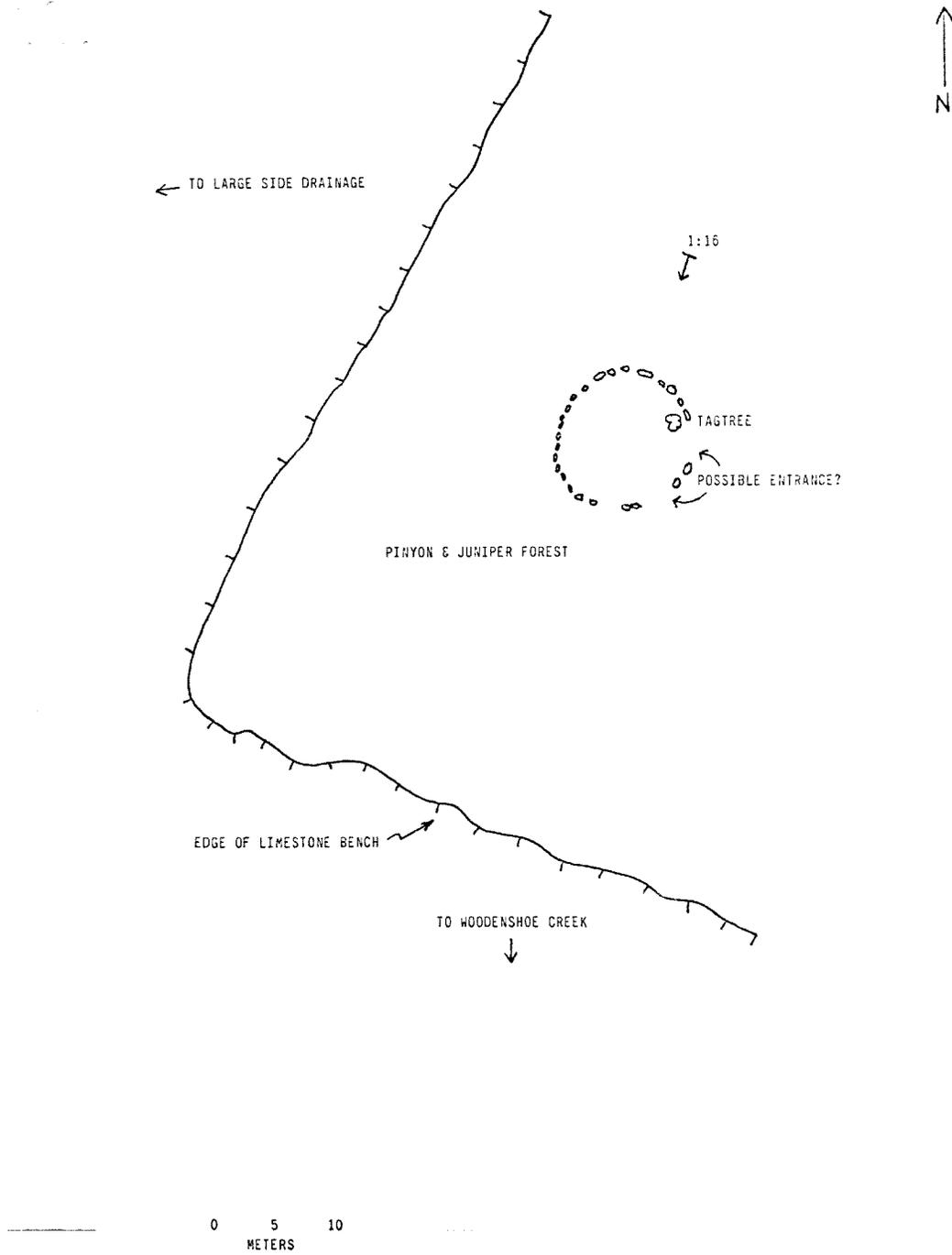


Figure I-4. Letter from Linda Honeycutt to P-III Associates, Inc. (Pages 4 of 4).

P-III ASSOCIATES
Cultural Resource Consultants

2212 S. West Temple, Suite 21
Salt Lake City, Utah 84115
801 / 467-5446

January 6, 1988

Ms. Linda Honeycutt
Woods Canyon Archeological Consultants
P.O. Box 253
Yellow Jacket, Colorado 81335

Dear Linda:

Regarding your letter of December 16, 1987, soliciting information on stone circles and rectangles in southeastern Utah, you should note that stone circles occur with some abundance in Salt Creek Canyon, Needles District, Canyonlands National Park. As you have observed in Woodenshoe Canyon, they invariably occur in unique settings, though not always where view qualities are especially good. They are, however, always rather difficult to get to, in many cases on rock pinnacles that can be reached only with ladders. They do indeed seem to be specialized sites within Pueblo III settlement patterns, in many respects functionally similar to towers at Hovenweep, Beef Basin and other locales. Like towers, they are quite unusual in their locational characteristics and at least frequently may be associated with two communication systems linked by line-of-sight from one to the next.

Although a few stone circle sites were recorded in Big Pocket on our 1985 Canyonlands survey (the report is still in draft form), we did observe a concentration farther downstream along Salt Creek from a helicopter. Many of these would require special logistics to gain access to and have not been seriously investigated. They are associated with a habitation concentration. Although your communication idea has merit, stone circles seem to be defensible sites that should also be looked at as possible strongholds against raiding. Obviously, defense and communication are not mutually exclusive.

Good luck with your research and keep us informed. Regards to Jerry and best of luck for the New Year!

Sincerely,

Gary M. Brown
Staff Archeologist

GMB/mas

Enclosures



Figure I-5. Letter from Gary Brown to Linda Honeycutt, 1988

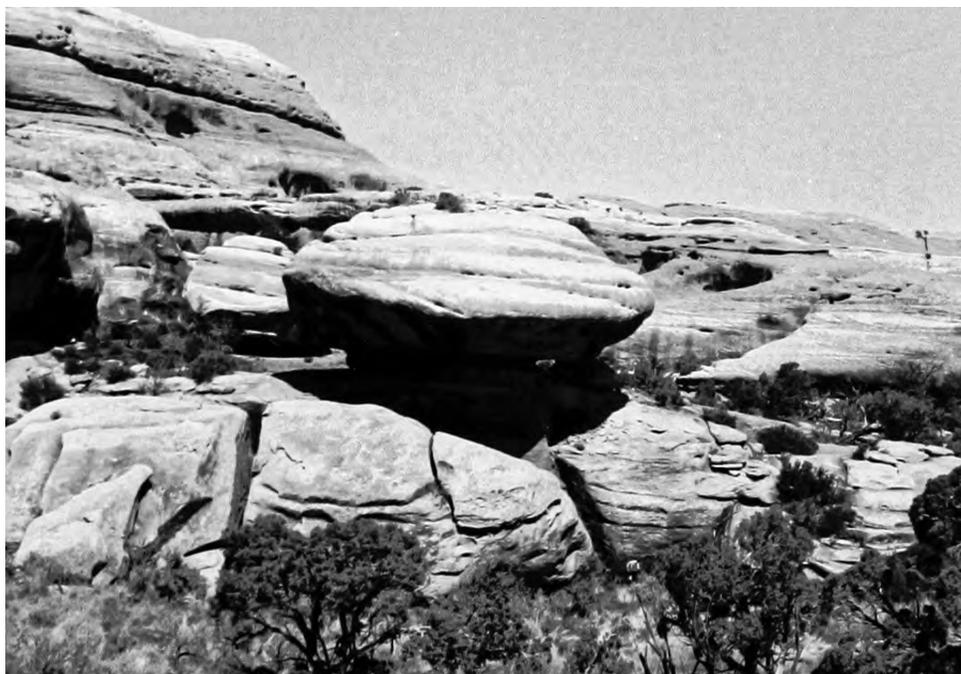


Figure I-6. Site 42SA1594 being recorded in 1986. Note crew member on terrace below site.

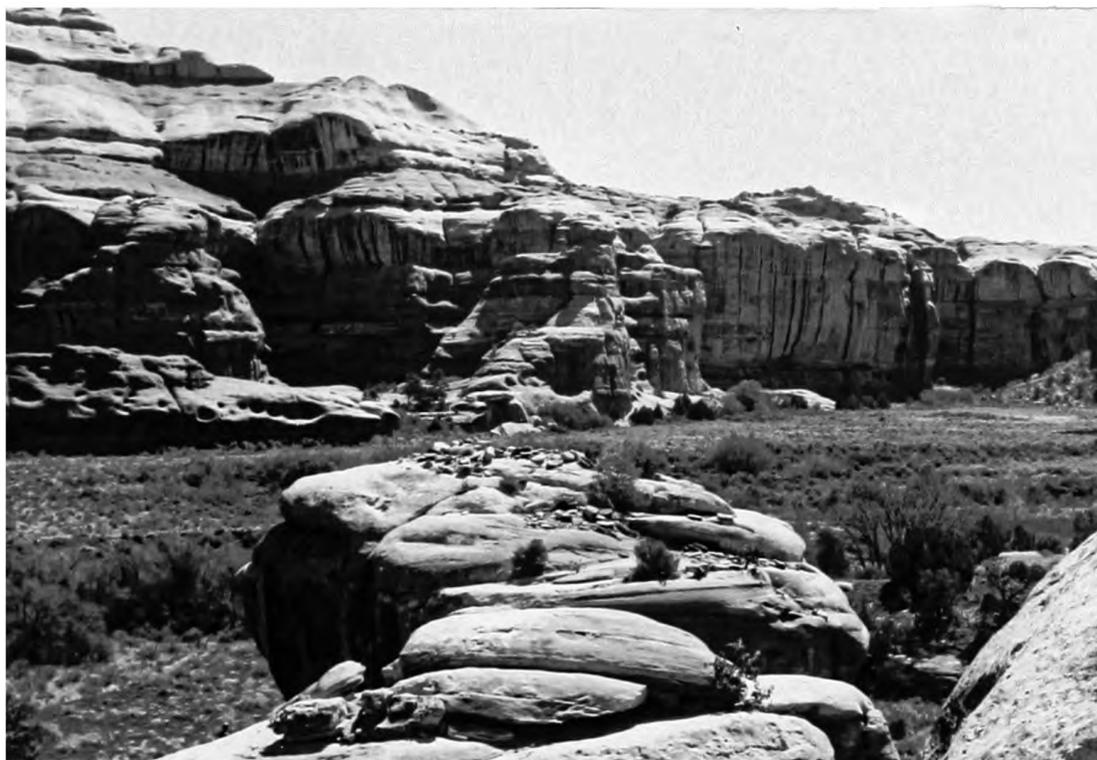


Figure I-7. Stone circles atop an inaccessible mushroom-shaped outcrop at site 42SA1594.



Figure I-8. Stone circle at site 42SA17764.



Figure I-9. Stone circle at site 42SA17769.

APPENDIX J.

Tree-ring Dating in the Needles District, Canyonlands National Park

Between 1984 and 1986, dendrochronological samples were collected from 5 sites in the Needles District.¹ These included two samples collected by P-III Associates from the Canyonlands Archeological Project, one each from site 42SA1581 and 42SA17118, and 29 samples from three sites, 42SA1470 (Tower Ruin), 42SA1491, and 42SA1563, from stabilizations activities by Nickens and Associates (Metzger and Chandler 1986).

These samples were all processed by the Laboratory of Tree-Ring Research at the University of Arizona. Of all of these samples, only one from a remodeled kiva (F8) at site 42SA1581 produced a

tree-ring date of AD 969–1131vv, indicating that the cutting date of the sample was much later. The other 30 samples were complacent and did not produce any tree-ring dates. Figures J-1–6 reproduces the correspondence with the laboratory from 1987.

Notes

1. Thompson (1978:51) incorrectly reports a tree ring date of AD 1223+ from site 42SA227 in Horse Canyon in the park. The sample which dates to 1223+ was originally obtained by Jack Rudy (1955) from site 42SA222 located in Beef Basin outside of the park.

REFERENCES

Metzger, Todd R. and Susan M. Chandler (compilers)

1986 *Ruins Stabilization Activities in Canyonlands National Park and Natural Bridges National Monument, Report of the Year 2 Field Season 1984-1986: Appendices and Maps*. Ruins Stabilization Report Technical Series 16. Nickens and Associates, Montrose, Colorado. Submitted to National Park Service, Rocky Mountain Region, Denver.

Rudy, Jack R.

1955 *Archeological Excavations in Beef Basin, Utah*. University of Utah Anthropological Papers of the No. 20. Salt Lake City.

Thompson, Richard A.

1978 *A Stratified Random Sample of the Cultural Resources in the Canyonlands Section of the Moab District of the Bureau of Land Management in Eastern Utah*. Utah Cultural Resource Series No. 1, Bureau of Land Management, Utah State Office, Salt Lake City, Utah.



THE UNIVERSITY OF ARIZONA
TUCSON, ARIZONA 85721

LABORATORY OF TREE-RING RESEARCH
BUILDING #58

April 9, 1987

Dr. Gary M. Brown
P-III Associates
2212 S. West Temple, Suite 21
Salt Lake City, Utah 84115

Dear Dr. Brown:

Unfortunately, the University of Utah library is up-to-date in its lack of a quadrangle report covering Utah Q and R. There is no such report because we have only one date from both quadrangles. We have no material from Utah Q, and only five sites from R are represented in our collections: 42Sa 1470 (16 samples), 42Sa 1491 (10 samples), 42Sa 1563 (3 samples), 42Sa 1581 (one sample), and 42Sa 17118 (one sample). The single date (969-1131vv) comes from 42Sa 1581. Enclosed are xerox copies of pertinent information from these sites.

We have no record of ever having received any material from 42Sa 1661. That doesn't mean we didn't get anything from there, just that if we did, it was not accessioned and probably was returned to the sender or, with their permission, discarded. Adrienne Anderson did send us a couple of undatable cottonwood samples from 42Sa 5379 in 1978. According to the correspondence, this site may be in R. Both samples were discarded or returned.

Please let me know if you need more information on any of these sites.

Sincerely,

A handwritten signature in cursive script that reads "Jeffrey S. Dean".

Jeffrey S. Dean
Professor of Dendrochronology

JSD:lh
Enclosure

Figure J-1. Laboratory of Tree-Ring Research correspondence, 1987.

Canyonlands National Park
 Site 42SA1470 Tower Ruin
 Dendrochronological Samples
 1984

Sample No.	Provenience ¹	Species	Core Length cm	Log Diameter cm	Log Length ² m	Comments	Date
D-1	Str.2 Secondary roof 5th from E. wall	Cottonwood	10.5	15	N/A	3 pieces	4/14
D-2	Str.2 Secondary roof 6th from E. wall	Juniper	5.5	11	N/A	3 pieces	4/14
Uwm- 261 D-3	Str.2 Secondary roof 7th from E. wall	Juniper	7.7	12	N/A	3 pieces	4/14
D-4	Str.2 Primary roof 1st from N. wall	Juniper	5	18	N/A	3 pieces	4/14
D-5	Str.2 Secondary roof beam 3rd from E. wall	Juniper	11.0	16	N/A	3 pieces	4/27
D-6	Str.2 Secondary roof 2nd from E. wall	Juniper	8.5	14	N/A	4 pieces	4/27
D-7	Str.2 Primary roof cribbing beam, 4th from top on E. wall	Juniper	11.5	17	N/A	3 pieces	4/27
D-8	Str.2 Primary beam 3rd from top on N. wall	Juniper	9.0	15	N/A	2 pieces	4/27
D-9	Str.2 Lower cribbed primary @ N. wall	Juniper	8.0	17	N/A	2 pieces	4/27
D-10	Str.2 Upper N. wall Primary	Juniper	9.5	18	N/A	3 pieces	4/27
D-11	Str.2 7th Secondary from E. wall	Juniper	8.0	13	N/A	1 piece	4/27
D-12	Str.2 Lower E. wall course log	Juniper	10.0	19.5	N/A	2 pieces	4/27
D-13	Str.3 Primary, 2nd from E. wall	Juniper	6.5	9.0	N/A	1 piece	4/27
D-14	Str.3 Primary, 3rd from E. wall	Juniper	8.0	11.0	N/A	4 pieces	4/27

Figure J-2. Laboratory of Tree-Ring Research correspondence, 1987.

Sample No.	Provenience ¹	Species	Core Length cm	Log Diameter cm	Log Length ² m	Comments	Date
D-15	Str.3 Primary, 5th from E. wall	Juniper	7.5	13.0	N/A	2 pieces	4/27
D-16	Str.3 Primary, 6th from E. wall west end	Juniper	7.0	12.0	N/A	3 pieces	4/27

¹ Dendro locations referenced on site map

² Log length not ascertainable. All are in situ.

³ Sample not submitted.

Figure J-3. Laboratory of Tree-Ring Research correspondence, 1987.

Canyonlands National Park
Whitewash Ruin - 42SA1491
Dendrochronological Samples
1984

Sample #	Timber #	Provenience ¹	Species	Core Length cm	Log Diameter cm	Log Length m	Comments	Date
D-1	T-1	Structure 5 - Beam on top of west wall; 100 cm from butt end of timber	Juniper	0.120	0.215	1.52	8 pieces	4/29
D-2	T-2	Structure 5 - Beam which rested on E/W walls; 200 cm from butt	Fir?	0.10	0.18	5.40	2 pieces	4/29
D-3	T-3	Structure 5 - Beam resting on SE corner 165 cm from butt	Juniper	0.13	0.20	2.95	2 pieces	4/29
D-4	T-7	Between Structures 5 and 4; 130 cm from butt	Juniper	0.12	0.20	unknown	1 piece	4/29
D-5	T-8	Structure 4 - Beam parallel to west wall; 50 cm from butt	Juniper	0.06	0.15	1.80	Pith not present	4/29
D-6	T-10	Structure 4 - Beam parallel to north wall; 125 cm from butt	Juniper	0.10	0.16	3.65	2 pieces	4/29
D-7	T-13	Structure 4 - Beam oriented NE-SW over T-11, 12 & 14; 130 cm from butt	Fir?	0.11	0.175	4.45	2 pieces	5/1
D-8	T-15	Structure 1 - Beam oriented NW-SE; was resting on W&S wall tops; 160 cm from butt	Pinyon	0.10	0.16	4.60		5/1

Figure J-4. Laboratory of Tree-Ring Research correspondence, 1987.

Sample #	Timber #	Provenience ¹	Species	Core Length cm	Log Diameter cm	Log Length m	Comments	Date
D-9	T-16	Structure 1 - Beam oriented NW-SE; was leaning up on south wall; 256 cm from butt	Cotton-wood?	0.09	0.135	3.86	3 pieces	5/1
D-10	T-12	Structure 4 - Beam oriented N-S; under T-13; 40 cm from butt end	Juniper	0.12	0.215	2.95	2 pieces	5/1

¹ Dendro. locations referenced on site map. Logs are not in situ.

Figure J-5. Laboratory of Tree-Ring Research correspondence, 1987.

APPENDIX K.

The Faces Motif Rock Art in Canyonlands National Park as Possible Ancestor Images

Nancy J. Coulam

The Faces Motif rock art is a unique anthropomorphic rock art style known only from the Canyonlands National Park area. Pierson (1962) and Schaafsma (1971) described a few of the anthropomorphs, but it was Noxon and Marcus (1985) who defined the Faces Motif and suggested it may have evolved out of the earlier anthropomorphic styles of the Colorado Plateau.

Schaafsma (1971:52) was the first to mention that attributes of the Faces Motif resembled those of elaborate anthropomorphic clay figurines found in the Fremont culture area located to the northwest of Canyonlands National Park. Because of the similar attributes, Sharrock (1966:61–62) and others have suggested that the Mesa Verde Anasazi who inhabited Canyonlands National Park may have borrowed Fremont motifs.

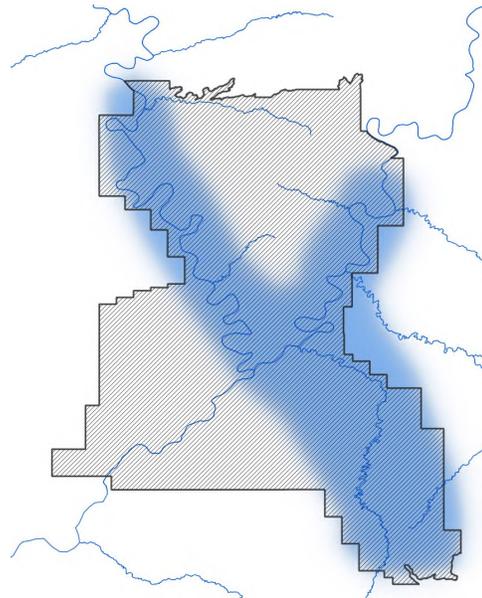
For example, Warner (1982:19) stated: “One conclusion that seems so obvious, is that the Anasazi in the Salt Creek area must have adopted the Fremont figurine expression in the form of the Salt Creek face motif.” This conclusion is challenged here. Multiple lines of evidence are brought forward to suggest that the Faces Motif represented ancestors of the Mesa Verde Anasazi people who lived in Canyonlands National Park during the thirteenth century.

Definition of the Faces Motif Rock Art Style

Schaafsma (1971:52) described the Faces Motif anthropomorphs as “dumpy short-waisted beings” and placed them within her Fremont rock art

zone, but Noxon and Marcus (1985) identified the Faces Motif as a style found only on Mesa Verde Anasazi sites located in Canyonlands National Park. Noxon and Marcus (1985) described the motif as pictographs and petroglyphs of nearly life-sized, front-facing humans (anthropomorphs) arranged in rows that appear to have been completed at one time.

The hallmark of the motif is a U-shaped face with one or more flat lines across the top of the head and a curved line for the chin. Eyes are the only facial feature. Bodies of the anthropomorphs end at the waist with ties or sashes or at the knee with kilts. None of the Faces Motif anthropomorphs have horns, limbs, nor overt indications of



K-1. Current distribution of Faces Motif in Canyonlands National Park.

gender, which are common among Fremont rock art anthropomorphs.

Domestic Context and Dating

Table K-1 shows that most of the Faces Motif anthropomorphs are located at masonry granaries and habitation structures. The architecture at these sites and surrounding sites is typical of the Pueblo III period of the Mesa Verde Anasazi region: there is no McElmo-style masonry from the earlier Pueblo II period (Lipe and Varien 1999; Smith 1987:64–65). The pottery on the Faces Motif sites and surrounding sites reflects production and interaction among people living along the western side of the Mesa Verde region during the Pueblo III period (Breternitz et al. 1974; Hurst 1995, 2008; Lucius 2021). A Bayesian chronological model of radiocarbon dates from Faces Motif sites and surrounding sites dates them to the Pueblo III period from about AD 1170 to 1300 (Appendix D).

Visibility and Group Identity

Most of the Faces Motif anthropomorphs are visible from across the canyons or rivers. Wobst (1977), McGuire (1981), and Wiessner (1983, 1997) found that visibility and intended audiences offer clues to the meanings and interpretations of stylistic forms. When stylistic forms are visible from great distances, the conveyed meaning tends to be about group identity. The less visible something is to members of a group, the less it carries stylistic messages.

Wobst (1977:328) gives the example of artifacts that are only visible to members of a household (such as kitchen utensils) are unlikely to carry messages of social identity or group affiliation. The distances at which the Faces Motif are visible indicate it was designed to convey information about the group of people who created it.

The smallest group who might have created the motif could have been an individual household or extended family. But with at least 13 documented Faces Motif sites (Table 1) and their geographic distribution (Figure K-1), the motif would have

been created by a larger group than a household or family.

As a traditional farming society, the next largest local group would have been a kin group, most likely a descent group whose members believe they are descended from a common ancestor or ancestors (Ember et al. 1974). Whether the descent group took the form of a lineage, clan, or moiety, such a localized kin group could be called a community (Befu and Plotnicov 1962), albeit a small one compared to the large, aggregated communities in the Mesa Verde region like Sand Canyon Pueblo, Mug House, and others thought to be organized into moieties, or dual descent groups (Kantner 2004:166–173; Lipe and Varien 1999; Whiteley 2016). Based on the traits that are shared across the Mesa Verde region such as pottery and architecture, archeologists believe the large communities served as nuclei for the small, residentially dispersed communities like that in Canyonlands National Park (Kantner 200; Lipe and Ortman 2000:92).

Attributes of the Faces Motif

This section describes attributes of 85 Faces Motif anthropomorphs from 13 sites (Table 1). Most of the Faces Motif sites are named for the obvious number of anthropomorphs depicted in them. The attributes are presented in decreasing frequency of occurrence. Archeological and ethnographic information is presented to help identify what the attributes might represent.

Faces and Eyes

Noxon and Marcus (1985) defined the Faces Motif based on the repetitive U-shaped faces and the lack of facial features except eyes. Table 1 shows that 56% of the anthropomorphs have eyes, mostly simple straight lines. The repetition and schematized shapes of the faces, the simplicity of the eyes, the absence of other facial features or limbs, indicate that specific individuals were not being portrayed.

Pierson (1962) and Schaafsma and Young (1993) suggested the lack of facial features meant

Table K-1. Attributes of Faces Motif Anthropomorphs from Thirteen Sites in Canyonlands National Park.

Site Name	Site Number	Site Type	Number of Anthropomorphs	Hair Bobs	Eyes	Chest Paint	Face Paint	Jewelry	Gorget	Sash	Headdress	Kilt	Bandolier
Thirteen Faces	42SA1652	granary	14	7	8	9		10	3	5		4	
Eleven Faces	42SA22690	rock art	12	9	12	9		1	10	8		2	
Striped Faces	42SA1592	habitation	9	7	1	1	8			3	7		
Nine Faces	42SA1486	granary	9	6	7	3		4	5	1	5		
Sky Faces	42SA25552	rock art	8	1	4	3			3	3			
-	42WN725	rock art	7	3				3		1			
Four Faces	42SA1629	habitation	6	6	5	4		4		2		1	
Five Faces	42SA7736	granary	5	3	5	5		5	2			2	1
Kilt Man	42SA25540	granary	4	2	1	3		2		3			1
Lathrop Ruin	42SA4974	granary	4	3	1	2			4	2	1		
Faces on River	42SA26527	granary	3										2
Two Faces	42SA1631	habitation	2	2	2	1		1				2	
Two More Faces	42SA1622	habitation	2	2	2	2		2	2	2			
Total			85	51	48	42	8	32	29	30	13	11	4

the Faces Motif represented masks. While archeologists debate whether the masks of the kachina cult developed in the Little Colorado River drainage in the late thirteenth century (Adams 1991) or in the Rio Grande from the Jornada Mogollon (Schaafsma 2014; Schaafsma and Schaafsma 1974), the Faces Motif is too early and too far north to represent masks of the kachina cult.

Instead of masks, the faces and eyes are suggestive of ancestor imagery (Figure K-2). This suggestion derives partly from similarity between the Faces Motif and how prehistoric Mesoamericans depicted ancestors (e.g., Halpin 2017) and partly from Marshman's (2016:293–294) suggestion that simple straight lines representing eyes on human effigy vessels from the Southwest might represent the closed eyes of the dead. Combining the simple eyes on the Faces Motif, the repetitive, schematized faces and bodies, the visibility of the anthropomorphs and details of costume and jewelry, it may be that the Faces Motif and the Southwestern human effigy vessels represent deceased persons or ancestors, as discussed in the final section.

Jewelry and Ornaments

Sixty-two percent of the Faces Motif anthropomorphs are shown wearing one or more types of jewelry, including earrings, hair ornaments, necklaces, pendants, and gorgets. Twenty percent of the Faces Motif anthropomorphs wear necklaces depicted by one or more lines of white or red dots at the neck. The dots may represent marine shell beads because shell was the most common material used for Southwestern jewelry from Basketmaker II through Pueblo IV (Barnes 2010:42–51; Mathien 1997, 2008; Mattson 2016).

Fifteen percent of the anthropomorphs wear earrings, mostly represented by vertical lines of white dots. The central anthropomorph at Five Faces is unique in its red and white concentric circles that look like ear spools. This anthropomorph also wears a necklace, a bandolier, and a kilt.

Fourteen percent of the anthropomorphs wear pendants. Ten pendants are red, two are white. Seven pendants are circular, five are rectangular. At Pueblo Bonito, Aztec West, and Grasshopper



K-2. Five Faces. Photograph courtesy of Randy Langstraat.

Pueblo, the colors and shapes of pendants have been interpreted as emblems of kin groups or social groups (Ditto 2017; Mattson 2016; Whittlesey and Reed 2001). The shape and color of the pendants and other jewelry on the Faces Motif may have conveyed similar information about the local group who created the motif.

Thirty-five percent of the anthropomorphs have crescent shapes at the neck interpreted as gorgets. Black gorgets are shown on Eleven Faces and white gorgets are shown on Sky Faces (Figures K-3, K-4). The gorgets might represent tapestry weave twilled textiles like one shown by Kent (1957:528; Fig. 48) that came from Gourd Cave House, Nitsie Canyon, Arizona (Suzanne Eckert, personal communication 2020). Kent wrote that similar crescents of yucca thread stitched with cotton had been found in sites in southwestern Colorado.

Hair Styles

Sixty percent of the Faces Motif anthropomorphs wear hair bobs or hair tied in bundles at the shoulders. The cords or ties around the hair may have been important to the creators of the Faces Motif because there are several abstracted anthropomorphs, like the leftmost blue anthropomorph at Four Faces (Figure K-5), showing just the cords tying the hair.

Bobbed hair was a common Ancestral Puebloan style worn by males and females over the centuries. In an analysis of Basketmaker rock art and human remains, Geib (2016:113, 317) found that bobbed hair was a male hair style. During Pueblo I, bobbed hair was apparently a female style (Guernsey 1931:94, Pl. 12; Kidder and Guernsey 1919). Bobbed hair on elaborate Fremont clay figurines are females that date to Pueblo II (see below).

Based on human effigy vessels, bobbed hair



K-3. Three of the Eleven Faces (42SA22690). Photograph courtesy of Randy Langstraat.



K-4. Sky Faces. Photograph courtesy of Randy Langstraat.

was a style worn by Chacoans and the Mesa Verde Anasazi. In Pueblo Bonito (Room 38), bobbed hair was present on a human effigy vessel found with scarlet macaw bones dated to cal AD 885–1080 (Pepper 1906; Watson et al. 2015: Table 1). One human effigy vessel with bobbed hair was found in Chacoan contexts at Aztec Ruin (Franklin and Reed 2016: Fig. 6-7; Morris 1928:304, 309). Gender on these Chacoan effigies is unknown.

Closer to Canyonlands in space and time, bobbed hair was present on a Pueblo III Mesa Verdean female effigy vessel from Alkali Ridge (Hurst 1994). This contemporary effigy vessel suggests the bobbed hair on the Faces Motif might

represent females, but kilts were typically male attire and 7 of the 11 kilt-wearing Faces Motif anthropomorphs have bobbed hair. Therefore, bobbed hair cannot be used to infer gender of the Faces Motif anthropomorphs, but the style does represent Anasazi and Fremont (Ancestral Puebloans) living on the Colorado Plateau from Basketmaker through Pueblo times.

Chest and Face Markings

Forty-nine percent of the Faces Motif anthropomorphs have lines (painted or pecked) on their chests. While tattoo tools have been found in the prehispanic Southwest (Gillreath-Brown et al. 2019), the extensive lines on the chests and faces



K-5. Four Faces.

of the Faces Motif anthropomorphs are suggestive of body paint rather than tattooing or clothing. Common designs on the chest are several parallel lines from one shoulder to the waist and a line from the neck to the waist with additional V-shaped lines from the shoulders to the waist.

Facial markings are only known from the Striped Faces site (Figure K-6). Eight of the nine anthropomorphs at this site have three sets of red lines from the eyes to the chin. This design is not found elsewhere in the Greater Southwest, including on elaborate Fremont figurines, human effigy vessels (Bradley 2017; Franklin and Reed 2016; Hurst 1994; Marshman 2016; VanPool et al. 2017), human remains (Caywood and Spicer 1935; Geib 2016), or Mimbres pottery (MimPIDD 2020). All of the Striped Faces anthropomorphs with facial marking also have hair combs. The significance of this unique Faces Motif panel is unknown.

Cotton Clothing

Forty-eight percent of the Faces Motif anthropomorphs wear what appears to be cotton clothing. Loom-woven cotton clothing was one of the symbols of social identity that spread across the Colorado Plateau after AD 1100 (Teague 1992, 2006). In the Needles District, there are a few cotton bolls,

cotton cordage, fragments of cotton cloth, spindle whorls, and at Bighorn Sheep Ruin, loom anchors in a kiva floor (Chandler 1990). This suggests that cotton may have been locally grown, spun, and woven into the types of clothing depicted on the Faces Motif.

Belts and Sashes. Thirty-five percent of the anthropomorphs have lines at the waist that may represent textile ties, belts, or sashes. Half of them are narrow white lines at the waist that may represent cotton ties or belts. Kent (1957:618–619) described narrow cotton ties as the prevailing fashion during Pueblo III and early Pueblo IV. Webster (1997:251–252) noted that narrow textiles produced on backstrap looms tend to be associated with women, while wider loom-woven cloth tends to be associated with men. These observations suggest the anthropomorphs with narrow white lines at the waist may represent women wearing textile ties, while the anthropomorphs with wide colored and decorated sashes may represent men wearing loom-woven cotton cloth.

Eighteen percent of the anthropomorphs wear wide decorated sashes. At Four Faces (Figure K-5), two anthropomorphs have wide sashes decorated with red triangles. The other wide decorated



K-6. Striped Faces. Photograph courtesy of Randy Langstraat.

sashes are stripes of red, white, black, or blue that are suggestive of the type of loom-woven cotton fabric that Kent (1957:642) called Anasazi striped twill. The most well-preserved piece of Anasazi striped twill is the Telluride Blanket, which came from a site just south of Canyonlands National Park. It dates to 848 ± 41 BP, cal AD 1045–1275 (Winston Hurst personal communication 2020; Sagstetter and Sagstetter 2008).

This date spans the Pueblo II–III periods and indicates Anasazi striped twill fabric was circulating in the local area when the Faces Motif was created. The Telluride Blanket helps reinforce the idea that the striped sashes on the Faces Motif may represent Anasazi striped twill fabric that was a marker of Mesa Verdean identity.

Kilts. Thirteen percent of the anthropomorphs are shown wearing kilts. Figure K-7 shows the kilted anthropomorphs at Thirteen Faces. Accord-

ing to Kent (1957) and Roediger (1991), kilts were historically worn by male participants in Pueblo ceremonials, but they may formerly have been everyday male costume. Kilts were common male clothing on Pueblo IV kiva murals (Hibben 1975; Smith 1952:120–121), but are rare archeological finds.

Fragments of possible thirteenth century kilts have been found at Aztec East (Richert 1975). A whole kilt from Hidden House (a Pueblo III Sinagua site) is made of plain weave white cloth with zigzag tapestry weave insets (Dixon 1956; Kent 1957:524, 539, 609). The zigzag pattern on this kilt helped inform the identification of the vertical zigzag lines below the sash on one of the anthropomorphs at Four Faces (Figure K-5) as a possible decorated kilt. Based on the archeological and historic records of kilt use, it seems possible the kilted Faces Motif anthropomorphs represent males and possibly male participants in some cere-



K-7. Thirteen Faces (42SA1652).

mony or ritual.

Headdresses

Fifteen percent of the Faces Motif anthropomorphs wear headdresses of feathers or hair combs. Eight headdresses are hair combs and five are feathers. Anderson (1978:59) identified the possible feather headdress on one of the anthropomorphs at Lathrop Ruin as a sickle, but comparison with Nine Faces suggests it might represent a feather headdress.

The creators of Nine Faces may have been using headdresses to establish a layout group (*sensu* Smith 1952) because the feather headdresses on Anthropomorphs 1 and 5 arc towards each other and between them Anthropomorph 3 wears a hair comb. Seven of the eight anthropomorphs at Striped Faces also wear hair combs.

Feathers were common elements of Pueblo IV–V Puebloan male attire (Dutton 1963; Freire-Marreco 1912). Hair combs were typically male ornaments from Basketmaker II through Pueblo III (Barnes 2010:183; Geib 2016:120–122; Hodge 1918:67; Quirolo 1987:88–89; Schuyler 2010: 32). In Grasshopper Pueblo, men with hair combs also had shell ornaments, bows, arrows, and quivers, which Whittlesey and Reid (2001) interpreted as evidence of a male sodality. It is possible the headdresses on the Faces Motif might represent similar social roles or groups.

At the Four Faces site (Figure K-5), red lines above the heads of the anthropomorphs have been identified as caps, crowns, or lightning symbols (Patterson-Rudolph 1997). They were not counted

as headdresses here. On the furthest right anthropomorph, the three vertical red zigzag lines below the sash are counted as a painted or embroidered kilt.

Bandoliers

Five percent of the Faces Motif anthropomorphs wear bandoliers crossing their chests. One of these is Kilt Man (Figure K-8). Another is the middle anthropomorph at Five Faces who wears a kilt, multi-strand white necklace, and earrings that look like earspools (Figure K-2). In the Pueblo IV murals, Smith (1952:292) thought bandoliers represented male warriors. While the Faces Motif predates the murals, it is possible the bandoliers represent male warriors.

Elaborate Fremont Figurines

Ever since Morss (1931) attempted to define a separate archeological culture located along the Fremont River and other tributaries of the Green River on the Colorado Plateau, archeologists have struggled to identify the precise nature and degree of similarities or differences between the Fremont and Anasazi archaeological traditions or cultures (e.g., Madsen 1979, 1982). Nevertheless, the idea persists that a recognizable and distinct Fremont style exists and the style may be evoked in anthropomorphic figurines—miniature representations of humans in clay (Janetski et al. 2011).

Janetski and others (2011) identified 148 anthropomorphic figurines or fragments of figurines from the Fremont culture area of the northern Colorado Plateau (excluding the Sevier culture area of the Great Basin). Most of these anthropomorphic



K-8. Kilt Man. Photograph courtesy of Randy Langstraat.

figurines are simple with raised noses and no clothing, jewelry, or body markings. In the Greater Southwest, such simple raised nose figurines form a continuum or clinal distribution of figurine construction stretching from Mexico through the Hohokam area by 1200 BC, and onto the Colorado Plateau where Basketmaker and Fremont figurines form the northern extension of the continuum (Aragon 2013; Bodily 2012; Guernsey 1931:Pl. 51; Morris 1951; Morss 1954; Nielsen 2012; Stinson 2004). Given this broad distribution, Wormington (1955:179) only considered the elaborate figurines a diagnostic Fremont style. It is these rare elaborate figurines that are thought to resemble the Faces Motif rock art (Noxon and Marcus 1985:83; Schaafsma 1971:52; Warner 1982). Only a handful of elaborate Fremont figurines exist and they are reviewed below.

Pilling's Cave Figurines

Eleven elaborate clay figurines were found lying in a row on a ledge above and behind a structure in Pilling's Cave (42EM3391) in Range Creek Canyon, a Green River tributary (Morss 1954). Wood from the structure is tree-ring dated to AD 839–995+vv (Yentsch et al. 2010). While far from a cutting date, AD 995+vv suggests the structure, and by extension the figurines, might date to the Pueblo II period, AD 900–1150.

A detailed description of the Pilling's fig-

urines is provided by Morss (1954:3-8); a photograph was published by Pitblado and others (2013). Five figurines represent females with raised breasts, hair bobs, single- or double-strand ornamented necklaces, two- or three-tiered jabot of teardrop-shaped ornaments, and double- or triple-strand belts comprised of circular or teardrop-shaped ornaments. At least three of the females have painted faces and three have painted chests.

Five figurines represent males. The males have hair but no hair bobs. They have double- or triple-strand necklaces and two have two-tiered jabot. One male has a single-strand ornamented belt, another has a three-strand ornamented belt. Three males wear breech cloths. Morss (1954:5) interpreted one of the males as wearing a kilt of fringed leather. Three males have face markings and two have chest markings.

Old Woman Site Figurines

Five elaborate figurines were found in a cist within a pitstructure at the Old Woman site (42SV7) (Taylor 1955, 1957). Within the cist, a stone slab covered the figurines. One of the figurines was arranged upright. Taylor named the pitstructure Shrine House because of the inferred ritual context of the figurines in the cist. Wood from Shrine House was radiocarbon dated to 1060 ± 200 BP, M-551 (Crane and Griffin 1959:189). With an error this large, the date is not very useful: it calibrates to cal AD 600–1290.

Three of the figurines represent females with eyes, raised breasts and noses, hair bobs, and necklaces. One has a three-tiered jabot while another has two pendants suspended from its necklace (Yoder personal communication 2021). One female has a single strand necklace, hair bobs, wide sash or belt at the waist, and vertical lines below the sash resembling some form of clothing, maybe an apron or skirt.

The male figurine is broken but has a single strand necklace and possibly a breech cloth. The smallest figurine may represent a child. Like the

others, it has applique eyes and a raised nose. Its terminus flares out like the tail of a fish, which Morss (1954) called a “stump leg terminus.” It may not be coincidental that anthropomorphized fish are depicted on Classic Mimbres pottery made after AD 1000 (Gilman et al. 2014; MimPIDD 2020) and the Pueblo of Zuni’s creation tale mentions children turned into aquatic creatures (Bunzel 1932).

Lee Figurine

The Lee figurine came from somewhere near the Fremont River (Nielsen 2012). It represents a full body from head to feet; like other elaborate Fremont figurines, it lacks arms. Facial details include eyes, nose, and mouth. It has facial markings of red stripes alternating with white dots on its cheeks. The figurine represents a child that was wrapped in cloth and placed on a cradleboard. Nielsen (2012) dated the cradleboard to 1020 ± 40 BP, cal AD 895–1160 or Pueblo II in the Mesa Verde Anasazi sequence.

Dillman Figurine

The fragmentary Dillman figurine came from somewhere near Nine Mile Canyon, a Green River tributary (Nielsen 2012; Pitblado et al. 2013). It represents a female with raised breasts. It has hair bobs, eyes, and a raised nose. Its face is painted and striped. It has a single strand necklace of circular discs. It has a red bandolier crossing the chest.

Elaborate Figurine Summary

Clay figurines are found everywhere in the Greater Southwest, but only the most elaborate figurines described above are considered a diagnostic trait of the Fremont archeological culture (Wormington 1955:179). The female figurines have breasts, hair bobs, necklaces, tiered ornamental jabot, ornamental belts, body markings, and skirts or aprons. The males have necklaces, breech cloths, and one from Pillings Cave has a leather kilt (Morss 1954:5). The few figurines from primary contexts (Pillings Cave, Old Woman site) suggest use in household rituals, possibly related to the life-cycle given that men, women, and chil-

dren are represented (Bodily 2012; Morss 1954). Dates for the elaborate figurines are limited, but suggestive of the Pueblo II period from about AD 900–1150.

Similarities and Differences between Elaborate Fremont Figurines and the Faces Motif

Similarities between the elaborate figurines and the Faces Motif led Sharrock (1966), Warner (1982), and others to suggest the Mesa Verde Anasazi living in Canyonlands National Park culture “borrowed” the motif from the Fremont, but are the attributes really the same? Hair bobs are the most similar attribute, but this style of hair dressing was worn by Basketmakers, Chacoans, and the Mesa Verde Anasazi, and presumably the Fremont based on the elaborate figurines. Hair bobs have not been reported from areas south of the Mogollon Rim (Aragon 2013; VanPool et al. 2017). The distribution of hair bobs indicates this was a style shared among Anasazi and Fremont (Ancestral Puebloans) living on the Colorado Plateau, but it was not exclusive to any one culture area, gender, or time period.

Body markings are a similar attribute of the figurines and the Faces Motif, but the specific design elements differ and body markings are also found on human effigy vessels from the Greater Southwest (Butterwick 1998, 2004; Elwood and Parker 1993; Franklin and Reed 2016; Marshman 2016; VanPool et al. 2017). The widespread distribution of body markings means that such markings are not culturally distinctive attributes.

Jewelry is a similar attribute of the figurines, the Faces Motif, and the human effigy vessels from across the Greater Southwest and not distinctive of any one prehistoric culture. The multi-tiered jabot and tear-drop shaped ornaments on the elaborate figurines appear to be unique to the Fremont. The dots representing jewelry on the Faces Motif and human effigy vessels resemble shell beads found across the Greater Southwest, although the pendants and the hair combs shown in the rock art resemble actual pendants and hair ornaments found

in large Southwestern sites (Barnes 2010; Ditto 2017; Mattson 2016; Whittlesey and Reed 2001).

An important difference between the Fremont culture area and the Mesa Verde and Anasazi regions is access to loom-woven cotton cloth. According to Teague (1992:51, 2006), common textile traditions are aspects of material culture that are especially revealing of who people are and how they identify themselves. None of the elaborate Fremont figurines seem to have cotton clothing. While one Pillings Cave figurine wears a kilt, Morss (1954:5) thought it represented leather, not cloth. The actual cloth that wraps the Lee Figurine has not been analyzed to determine its composition, but beyond this possible cotton cloth, there is little (if any) evidence that the Fremont of the northern Colorado Plateau had access to cotton cloth. This contrasts with the recovery of actual cotton in Canyonlands National Park and the clothing depicted on the Faces Motif anthropomorphs. The message being conveyed by the Faces Motif appears to be that the local group who made the rock art wore cotton clothing and were participants in the common textile tradition of the Anasazi regions.

Finally, there are differences in the visibility and intended audiences of the elaborate Fremont figurines and the Faces Motif. The Faces Motif was visible in public spaces where it would have conveyed information about the small group of people who lived in the canyons during Pueblo III. This group was probably a kin group who considered themselves united by descent from a common ancestor or ancestors. This group had loom-woven cotton cloth including kilts and sashes, head-dresses of hair combs and feathers, and exotic shell jewelry. In contrast, the figurines at Pillings Cave and the Old Woman site were manufactured for household consumption only, probably during the Pueblo II period.

The Faces Motif as Possible Ancestor Images

Cross-cultural research indicates that beliefs

and ritual practices involving ancestors, called ancestor veneration or the cult of the dead, arise in societies where descent groups control rights to land and resources and there is inequality and conflict over resources (Glazier and Ember 2019). Deceased persons who are selected for the role of ancestor do not have to be actual forebears, they may be important persons from the remote past, or persons of power and privilege like community leaders (Colby 1976; Hageman and Hill 2016). The living members of the descent group honor or venerate the ancestors, believing that the spirits of the deceased ancestors will provide assistance or bring good fortune to the group. Examples include Mayan, Mixtec, and Zapotec communities who pray to the spirits of the ancestors and who keep the dead close to the living by burying them under house floors, and who use pottery figurines to represent ancestors (Marcus and Flannery 1994:63). A contemporary example is Day of the Dead celebrants who place photographs of ancestors on altars, along with flowers and food (Butterwick 1998).

As mentioned above, many of the large Pueblo III communities in the Mesa Verde region and the earlier great houses in Chaco Canyon had architectural layouts inferred to represent moieties or dual descent groups (Kantner 2004:171–173; Lipe and Ortman 2000:108-109; Lipe and Varien 1996; Heitman and Plog 2006; Ware 2018; Whiteley 2015, 2016). Ancestor veneration is evidenced at these large communities based on both subfloor burials that kept ancestors close to the living and by the ossuaries in Pueblo Bonito and at Wallace Ruin where multiple generations of individuals were interred with offerings of vessels, ornaments, and ritual objects (Bradley 2017; Heitman and Plog 2006; Martin et al. 2004; Plog and Heitman 2010).

Additional archeological evidence for ancestor veneration, according to Hill and Hageman (2016), may be symbols or images of ancestors in rock art, on painted pottery, or in sculptural forms including figurines or effigy vessels. With mortuary practices

providing strong evidence for the practice of ancestor veneration in the Mesa Verde region during Pueblo III (Bradley 2017), it is possible the Faces Motif symbolizes ancestors of the kin group living in Canyonlands National Park. This suggestion is based on the visibility of the rock art, the repetition of the human form, the simple slit eyes that might represent the closed eyes of the dead, and the emphasis on clothing and jewelry, which could have served as identifiers of the kin group or community.

While equating the Faces Motif with ancestors is speculative and not a testable scientific hypothesis, the elements that cross-cultural research indicates need to be present for a society to have ancestor beliefs and practices were present in the Mesa Verde region when the Faces Motif was created. As mentioned, ancestor veneration arises where descent groups control resources and there is inequality and conflict. In the Mesa Verde region, violence and inequality were widespread (Kohler et al. 2014; Lipe and Varien 1996:335–339). The large communities like Mug House and Sand Canyon Pueblo had spatially segregated descent groups which appear to represent patrimoieties (Kantner 2004:171–173; Lipe and Varien 1996). The small dispersed communities like that in Canyonlands National Park are believed to have had some ties to the larger communities, suggesting those in the small communities might have shared in the regional beliefs and practices of ancestor veneration that were practiced in the larger communities (Kantner 2004:166; Duff and Wilshusen 2000).

While subfloor burials were common across the Greater Southwest, at least one of the larger Mesa Verdean communities (Wallace Ruin) had special mortuary practices that mimicked those established at Pueblo Bonito during the Pueblo II period, suggesting that some people venerated ancestors from Chaco Canyon (Bradley 2017). While not specifically cited as evidence of ancestor veneration, there is evidence that Pueblo III Mesa Verdeans created other symbolic links to the past and specifically to the Chacoan past. This evidence includes the reoccupation and reuse of previously abandoned Chacoan outliers, construction of D-shaped structures and towers that mimicked Chacoan architecture, the crafting of Mesa Verde mugs in imitation of Chacoan pitchers (Bradley 2008; Van Dyke and King 2010). Combining these lines of evidence, it is suggested that a small kin group placed the Faces Motif on canyon walls to symbolize their ownership of resources and to represent their unity and esprit de corps as a kin group who participated in the beliefs and practices of the greater Mesa Verdean society.

Acknowledgments. I am grateful to many individuals who helped with this analysis including Cynthia Bradley, Suzanne Eckert, Phil Geib, Winston Hurst, Bill Lucius, Amy Marshman, Laura Martin, Glenna Nielsen-Grimm, David Yoder, and several anonymous reviewers. Randy Langstraat generously provided some of the photographs of the Faces Motif sites.

REFERENCES

- Adams, E. Charles
1991 *The Origin and Development of the Pueblo Katsina Cult*. University of Arizona Press, Tucson.
- Anderson, Adrienne
1978 *Archeological Resources of Canyonlands, Capitol Reef and Arches National Parks and Natural Bridges National Monument, Southeastern Utah*. Midwest Archeological Center, National Park Service, Lincoln, Nebraska.

- Aragon, Leslie D.
 2013 Figuring Out Figurines: An Ontological Approach to Hohokam Anthropomorphic Figures from the Phoenix Basin. Master's thesis, Department of Anthropology, University of Arizona, Tucson.
- Barnes, Zonna
 2010 Social Identity and Ornamentation in the Ancestral Puebloan Southwest: Basketmaker II to Pueblo IV. Master's thesis, Department of Anthropology, University of Colorado, Boulder.
- Befu, Harumi, and Leonard Plotnicov
 1962 Types of Corporate Unilineal Descent Groups. *American Anthropologist* 64:313–327.
- Bodily, Mark L.
 2012 Utah Valley Fremont Figurines: Function and Ritual Abandonment. *Utah Archaeology* 25:21–42.
- Bradley, Bruce
 2008 Pitchers to Mugs: Chacoan Revival at Sand Canyon Pueblo. *Kiva* 74:247–262.
- Bradley, Cynthia Smith
 2017 Remaking the Mazeway: Skeletal and Archaeological Evidence of a Variant Ancestral Pueblo Mortuary Rite at Wallace Ruin (USA). PhD dissertation, Department of Archaeology, University of Exeter.
- Breternitz, David A., Arthur H. Rohn, Jr., and Elizabeth A. Morris
 1974 *Prehistoric Ceramics of the Mesa Verde Region*. Museum of Northern Arizona Ceramic Series No. 5. Flagstaff.
- Bunzel, Ruth L.
 1932 Zuñi Origin Myths. In *Introduction to Zuñi Ceremonialism*, edited by M. W. Sterling pp. 584–602. Forty-seventh Annual Report of the Bureau of American Ethnology, 1929–1930. Smithsonian Institution, Washington DC.
- Butterwick, Kristi M.
 1998 Days of the Dead: Ritual Consumption and Ancestor Worship in an Ancient west Mexican Society. PhD dissertation, Department of Anthropology, University of Colorado, Boulder.
 2004 *Heritage of Power: Ancient Sculpture from West Mexico, the Andrall E. Pearson Family Collection*. Metropolitan Museum of Art, New York.
- Caywood, Louis R., and Edward H. Spicer
 1935 *Tuzigoot, the Excavation and Repair of a Ruin on the Verde River near Clarkdale, Arizona*. National Park Service, Field Division of Education, Berkeley.
- Chandler, Susan M.
 1990 Limited Excavations at Bighorn Sheep Ruin (42SA1563) Canyonlands National Park, Utah. *Utah Archaeology* 3:85–105.
- Colby, Benjamin N.
 1976 The Anomalous Ixil—Bypassed by the Postclassic? *American Antiquity* 41:74–80.

- Crane, H. R., and James B. Griffin
 1959 University of Michigan Radiocarbon Dates IV. *Radiocarbon* 1:173–198.
- Ditto, Emily C.
 2017 *Cosmological Caches: Organization and Power at Chaco Canyon, New Mexico, A.D. 850–1150*. PhD dissertation, Department of Anthropology, University of North Carolina, Chapel Hill.
- Dixon, Keith A.
 1956 *Hidden House, A Cliff Ruin in Sycamore Canyon, Central Arizona*. Museum of Northern Arizona Bulletin No. 29. Northern Arizona Society of Science and Art, Flagstaff.
- Duff, Andrew I., and Richard H. Wilshusen
 2000 Prehistoric Population Dynamics in the Northern San Juan. *Kiva* 66:167–190.
- Dutton, Bertha
 1963 *Sun Father's Way, the Murals of Kuaua: A Pueblo Ruin, Coronado State Monument, New Mexico*. University of New Mexico Press, Albuquerque.
- Elwood, Priscilla B. and Douglas R. Parker
 1993 Yellow Jacket (5MT-11) Human Effigy Vessel. In *Why Museums Collect, Papers in Honor of Joe Ben Wheat*. Archaeological Society of New Mexico Vol. 19, edited by M. S. Duran and D. T. Kirkpatrick, pp. 69–88. Albuquerque, New Mexico.
- Ember, Carol R., Melvin Ember, and Burton Pasternak
 1974 On the Development of Unilineal Descent. *Journal of Anthropological Research* 30:69–94.
- Franklin, Hayward H. and Lori S. Reed
 2016 Human Effigy Vessels from Chaco Culture Outlying Communities. *Pottery Southwest* 32(1):2–19.
- Freire-Marreco, Barbara
 1912 Historical Field Drawing of Tewa Pueblo Indians, Arizona or New Mexico, USA. Pitt Rivers Museum. Electronic document, <http://web.prm.ox.ac.uk/bodyarts/index.php/temporary-body-arts/body-painting/193-native-american-performance.html>, accessed May 1, 2020.
- Geib, Phil R.
 2016 *Basketmaker II Warfare and Fending Sticks in the North American Southwest*. PhD dissertation, Department of Anthropology, University of New Mexico, Albuquerque.
- Gillreath-Brown, Andrew, Aaron Deter-Wolf, Karen R. Adams, Valerie Lynch-Holm, Samantha Fulgham, Shannon Tushingam, William D. Lipe, and R.G. Matson
 2019 Redefining the Age of Tattooing in Western North America: A 2000-Year-Old Artifact from Utah. *Journal of Archaeological Science: Reports* 24:1064–1075.
- Gilman, Patricia A., Marc Thompson, and Kristina C. Wyckoff
 2014 Ritual Change and the Distant: Mesoamerican Iconography, Scarlet Macaws, and Great Kivas in the Mimbres Region of Southwestern New Mexico. *American Antiquity* 79:90–107.
- Glazier, Stephen D. and Carol R. Ember

- 2018 Religion. In *Explaining Human Culture*, edited by Carol. R. Ember. Human Relations Area Files, Electronic document, <http://hraf.yale.edu/ehc/summaries/religion>, accessed June 1, 2020.
- Guernsey, Samuel James
 1931 *Explorations in Northeastern Arizona; Report on the Archaeological Fieldwork of 1920–1923*. Papers of the Peabody Museum of American Archaeology and Ethnology Vol. XII, No. 1. Harvard University, Cambridge, Massachusetts.
- Hageman, Jon B. and Erica Hill
 2016 Leveraging the Dead: The Ethnography of Ancestors. In *The Archaeology of Ancestors: Death, Memory, and Veneration*, edited by Jon B. Hageman and Erica Hill, pp. 3–41. University Press of Florida, Gainesville.
- Halpin, Atalie Tate
 2018 Interpreting Tepantitla Patio 2 Mural (Teotihuacan, Mexico) as an Ancestral Figure. Master's thesis, Department of Art History, Californian State University, Chico.
- Heitman, Carrie C., and Stephen Plog
 2006 Kinship and the Dynamics of the House: Rediscovering Dualism in the Pueblo Past. In *A Catalyst for Ideas: Anthropological Archaeology and the Legacy of Douglas W. Schwartz*, edited by Vernon Scarborough, pp. 69–100. School of American Research Press, Santa Fe.
- Hibben, Frank C.
 1975 *Kiva Art of the Anasazi at Pottery Mound*. KC Publications, Las Vegas.
- Hill, Erica, and Jon B. Hageman
 2016 The Archaeology of Ancestors. In *The Archaeology of Ancestors: Death, Memory, and Veneration*, edited by Jon B. Hageman and Erica Hill, pp. 42–80. University Press of Florida, Gainesville.
- Hodge, F. W.
 1918 Excavations at the Zuñi Pueblo of Hawikuh in 1917. *Art and Archaeology* 7(9):367–379. Also, *Smithsonian Miscellaneous Collections* 68(12):61–71.
- Hurst, Winston B.
 1994 The Little Man and the Old Character: Two Human Effigy Pots from Alkali Ridge. *Blue Mountain Shadows* 13:47–51.
 1995 Analysis of Collected Ceramic Artifacts. In *Holocene Archeology Near Squaw Butte, Canyonlands National Park, Utah*, by Betsy L. Tipps, pp. 68–71. National Park Service, Rocky Mountain Region, Denver.
 2008 Analysis of Ceramic Collections from the Canyonlands National Park SEUG River Corridor Survey (CANY-520), 2005–2006. In *2004–2006 River Corridor Architecture and Rock Art Survey*, by Sue Eininger, pp. 221–329. National Park Service, Southeast Utah Group, Moab.
- Janetski, Joel C., Cady B. Jardine, and Christopher N. Watkins
 2011 Interaction and Exchange in Fremont Society. In *Perspectives on Prehistoric Trade and Exchange in California and the Great Basin*, edited by Richard E. Hughes, pp. 22–54. University of Utah Press, Salt Lake City.

- Kantner, John
2004 *Ancient Puebloan Southwest*. Cambridge University Press, Cambridge.
- Kent, Kate Peck
1957 *The Cultivation and Weaving of Cotton in the Prehistoric Southwestern United States*. Transactions of the American Philosophical Society Vol. 47, Pt. 3. Philadelphia.
- Kidder, Alfred Vincent and Samuel J. Guernsey
1919 *Archeological Explorations in Northeastern Arizona*. Bureau of American Ethnology Bulletin No. 65. Washington DC.
- Kohler, Timothy A., Scott G. Ortman, Katie E. Grundtish, Carly M. Fitzpatrick, and Sarah M. Cole
2014 The Better Angels of their Nature: Declining Violence through Time Among Prehistoric Farmers of the Pueblo Southwest. *American Antiquity* 79:444–464.
- Kozuch, Laura
2002 Olivella Beads from Spiro and the Plains. *American Antiquity* 67:697–709.
- Lipe, William D., and Scott G. Ortman
2000 Spatial Patterning in Northern San Juan Villages, A.D. 1050–1300. *Kiva* 66:91–122.
- Lipe, William D., and Mark D. Varien
1999 Pueblo III (A.D. 1150–1300). In *Colorado Prehistory: A Context for the Southern Colorado River Basin*, edited by William D. Lipe, Mark Varien, and Richard Wilshusen, pp. 290–352. Colorado Council of Professional Archaeologists, Denver
- Lucius, William A.
2021 Understanding Prehistoric Pottery in the Needles District, Canyonlands National Park, Utah: Wider Contexts and Perspectives. In *Archaic Foragers and Ancestral Puebloans of Canyonlands National Park*, by Alan R. Schroedl and Nancy J. Coulam, pp. 82–90. Canyonlands Archeological Project Report No. 5. P-III Associates, Inc., St George, Utah.
- Madsen, David B.
1979 The Fremont and the Sevier: Defining Prehistoric Agriculturists North of the Anasazi. *American Antiquity* 44:711–722.
1982 Salvage Excavations at Ticaboo Town Ruin (42GA2295). In *Archaeological Investigations in Utah at Fish Springs, Clay Basin, Northern San Rafael Swell, Southern Henry Mountains*, assembled by David B. Madsen and Richard E. Fike, pp. 1–41. Utah Cultural Resource Series No. 12. Bureau of Land Management, Utah State Office, Salt Lake City.
- Marcus, Joyce, and Kent V. Flannery
1994 Ancient Zapotec Ritual and Religion: An Application of the Direct Historical Approach. In *The Ancient Mind, Elements of Cognitive Archaeology*, edited by Colin Renfrew and Ezra B. W. Zubrow. Pp. 55–74. Cambridge University Press, Cambridge.
- Marshman, Amy Garvin
2016 Puebloan Human Effigy Vessels: An Examination of Iconography and Tradition. PhD dissertation, Department of Art History, Virginia Commonwealth University, Richmond, Virginia.

- Martin, Debra L., Nancy J. Akins, Alan H. Goodman, H. Wolcott Toll, and Alan C. Swedlund
 2001 *Total, Time and the Rivers Flowing: Excavations in the La Plata Valley*, Vol. 5, Harmony and Discord: Bioarchaeology. Archaeology Notes 242. Office of Archaeological Studies, Santa Fe.
- Mathien, Frances Joan
 1997 Ornaments of the Chaco Anasazi. In *Ceramics, Lithics, and Ornaments of Chaco Canyon: Lithics and Ornaments*, edited by Frances Joan Mathien, pp. 1119–1220. Publications in Archeology 18G, Chaco Canyon Studies, National Park Service, Santa Fe.
 2008 Analysis of Ornaments and Other Unusual Objects from the Bluff Great House and Sites in the Comb Wash Community. In *Chaco and After in the Northern San Juan*, edited by Catherine M. Cameron, pp. 759–807. University of Arizona Press, Tucson.
- Mattson, Hannah V.
 2016 Ornaments as Socially Valuable Objects: Jewelry and Identity in the Chaco and Post-Chaco Worlds. *Journal of Anthropological Archaeology* 42:122–139.
- McGuire, Randall H.
 1981 A Consideration of Style in Archaeology. *Atlatl* 2:13–29.
- MimPIDD (Mimbres Pottery Images Digital Database).
 2020 Accessed: <https://core.tdar.org/collection/22070/mimbres-pottery-images-digital-database-with-search>, accessed July 30, 2020.
- Morris, Earl H.
 1928 *Notes on Excavations in the Aztec Ruin*. Anthropological Papers of the American Museum of Natural History, Vol. XXVI. American Museum Press, New York.
 1951 Basketmaker III Human Figurines from Northeastern Arizona. *American Antiquity* 17:33–40.
- Morss, Noel
 1931 *The Ancient Culture of the Fremont River in Utah*. Papers of the Peabody Museum of Archaeology and Ethnology Vol. 12, No. 3. Cambridge.
 1954 *Clay Figurines of the American Southwest*. Papers of the Peabody Museum of American Archaeology and Ethnology, Vol. 49, No. 1. Harvard University, Cambridge, Massachusetts.
- Nielsen, Glenna
 2012 Babies and Cradles: A Comparison of Figurines in the Southwest, and West Mexico. In *An Archaeological Legacy: Essays in Honor of Ray T. Matheny*, edited by Joel C. Janetski, Glenna Nielson, and Deanne G. Matheny, pp. 143–161. Museum of Peoples and Culture, Occasional Papers No. 18, Brigham Young University, Provo.
- Noxon, John S. and Deborah A. Marcus
 1985 *Significant Rock Art Sites in the Needles District of Canyonlands National Park, Southeastern Utah*. Native American Rock Art Research Associates, Monticello, Utah. Submitted to National Park Service, Canyonlands National Park, Moab, Utah.
- Patterson-Rudolph, Carol

- 1997 *On the Trail of Spider Woman: Petroglyphs, Pictographs and Mythos of the Southwest*. Ancient City Press, Santa Fe, New Mexico.
- Pepper, George H.
 1906 *Human Effigy Vases from Chaco Cañon, New Mexico*. Anthropological Papers of the American Museum of Natural History, Boas Anniversary Volume, pp. 320-334. G. E. Stechert & Co., New York.
- Pierson, Lloyd M.
 1962 Archeological Resources of the Needles—Salt Creek Area, Utah. *Utah Archaeology* 8(2):1–3.
- Pitblado, Bonnie L., Joel C. Janetski, Molly Boeka Cannon, and Kathleen Kirkham
 2013 Archaeological Fingerprinting and Fremont Figurines: Reuniting the Iconic Pilling Collection. *Advances in Archaeological Practice* 1(1):3–12.
- Plog, Stephen and Carrie C. Heitman
 2010 Hierarchy and Social Inequality in the American Southwest, A.D. 800–1200. *Proceedings of the National Academy of Sciences* 107:19619–19626.
- Quirolo, Mary M.
 1987 The Culture History of Canyon del Muerto, Arizona: Basketmaker II - Pueblo I. Master's thesis, Department of Archaeology, Simon Fraser University, Burnaby, British Columbia.
- Richert, Roland
 1975 *Excavation of a Portion of the East Ruins, Aztec Ruins National Monument, New Mexico*. Reprinted. Originally published 1964, Vol. 4, National Park Service, Southwestern Parks and Monuments Association Technical Series, Coolidge, Arizona.
- Roediger, Virginia More
 1991 *Ceremonial Costumes of the Pueblo Indians: Their Evolution, Fabrication, and Significance in the Prayer Drama*. Electronic document, <https://publishing.cdlib.org/ucpressebooks/view?docId=ft8870087s&chunk.id=d0e959&toc.depth=1&toc.id=d0e959&brand=ucpress>, University of California Press, Berkeley, accessed June 26, 2020.
- Sagstetter, Beth and Bill Sagstetter
 2008 *Unraveling the Mysteries of the Telluride Blanket*. BenchMark Publishing, Denver.
- Schaafsma, Polly
 1971 *The Rock Art of Utah: A Study from the Donald Scott Collection*. University of Utah Press, Salt Lake City.
 2014 The Morning Star/Rain/Maize Complex in the American Southwest. In *Astronomy and Ceremony in the Prehistoric Southwest: Revisited. Collaborations in Cultural Astronomy*, edited by Gregory E. Munson, Todd W. Bostwick, and Tony Hull, pp. 19–28. Anthropological Papers No. 9. Maxwell Museum of Anthropology, University of New Mexico, Albuquerque.
- Schaafsma, Polly, and Curtis F. Schaafsma
 1974 Evidence for the Origins of the Pueblo Katchina Cult as Suggested by Southwestern Rock Art. *American Antiquity* 39:535–545.

- Schaafsma, Polly, and M. Jane Young
 1983 Early Masks and Faces in Southwest Rock Art. In *Collected Papers in Honor of Charlie R. Steen, Jr.*, edited by Nancy L. Fox, pp. 11–33. Papers of the Archaeological Society of New Mexico No. 8. Albuquerque Archaeological Society Press, Albuquerque.
- Schuyler, Lucy C.
 2010 *The Jewelry of Tijeras Pueblo*. Maxwell Museum of Anthropological Technical Series No. 15. Albuquerque, New Mexico.
- Sharrock, Floyd W.
 1966 *An Archeological Survey of Canyonlands National Park*. University of Utah Anthropological Papers No. 83, Miscellaneous Paper No. 12. Salt Lake City.
- Smith, Jack E.
 1987 *Mesas, Cliffs, and Canyons: The University of Colorado Survey of Mesa Verde National Park, 1971, 1977*. Mesa Verde Museum Association, Mesa Verde National Park, Colorado.
- Smith, Watson
 1952 *Kiva Mural Decorations at Awatovi and Kawaika-a, with a Survey of Other Wall Paintings in the Pueblo Southwest*. Papers of the Peabody Museum of American Archaeology and Ethnology Vol. 37. Cambridge, Massachusetts.
- Stinson, Susan L.
 2004 Household Ritual, Gender, and Figurines in the Hohokam Regional System. PhD dissertation, Department of Anthropology, University of Arizona, Tucson.
- Taylor, Dee C.
 1955 Archeological Excavations near Salina, Utah. *Utah Archeology: A Newsletter* 1(4):3–8.
- 1957 *Two Fremont Sites and Their Position in Southwestern Prehistory*. University of Utah Anthropological Papers No. 29. Salt Lake City.
- Teague, Lynn S.
 1992 *Textiles and Identify in Prehistoric Southwestern North America*. Textile Society of America Symposium Proceedings No. 587. pp. 51–59. University of Nebraska, Lincoln.
- 2006 The Fabric of their Lives. *Kiva* 71:349–366.
- Van Dyke, Ruth M., and Anthony G. King
 2010 Connecting Worlds: Pueblo III Towers in the Northern San Juan. *Kiva* 75:351–375.
- VanPool, Christine S., Todd L. VanPool, and Lauren W. Downs
 2017 Dressing the Person: Clothing and Identity in the Cases Grandes World. *American Antiquity* 82:262–287.
- Ware, John
 2018 Kinship and Community in the Northern Southwest: Chaco and Beyond. *American Antiquity* 83:639–658.

- Warner, Jesse E.
1982 Figurines and their Similarity to Rock Art Figures. *Utah Rock Art* 2:11–20.
- Watson, Adam S., Stephen Plog, Brendan J. Culleton, Patricia A. Gilman, Steven A. LeBlanc, Peter M. Whiteley, Santiago Claramunt, and Douglas J. Kennett
2015 Early Procurement of Scarlet Macaws and the Emergence of Social Complexity in Chaco Canyon, NM. *Proceedings of the National Academies of Science* 111:8238–8243.
- Webster, Laurie D.
1997 Effects of European Contact on Textile Production and Exchange in the North American Southwest: A Pueblo Case Study. PhD. Dissertation, Department of Anthropology, University of Arizona, Tucson.
- Whiteley, Peter
2015 Chacoan Kinship. In *Chaco Revisited: New Research on the Prehistory of Chaco Canyon, New Mexico*, edited by Carrie C. Heitman and Stephen Plog, pp. 272–304. University of Arizona Press, Tucson.
2016 Dualism and Pluralism in Pueblo Kinship and Ritual Systems. *Structure and Dynamics* 9:252–272.
- Whittlesey, Stephanie M. and J. Jefferson Reid
2001 Mortuary Ritual and Organizational Inferences at Grasshopper Pueblo, Arizona. In *Ancient Burial Practices in the American Southwest*, edited by Douglas R. Mitchell and Judy L. Brunson-Hadley, pp. 68–96. University of New Mexico Press, Albuquerque.
- Wiessner, Polly
1983 Style and Social Information in Kalahari San Projectile Points. *American Antiquity* 48:253–276.
1997 Seeking Guidelines through an Evolutionary Approach: Style Revisited among the !Kung San (*Ju/'hoansi*) of the 1990s. In *Rediscovering Darwin: Evolutionary Theory and Archeological Explanation*, edited by C. Michael Barton and Geoffrey A. Clark, pp. 157–176. Archeological Papers of the American Anthropological Association No. 7. Washington DC.
- Wobst, H. Martin
1977 Stylistic Behavior and Information Exchange. In *Papers for the Director: Research Essays in Honor of James B. Griffin*, edited by C. E. Cleland, pp. 317–342. Anthropological Papers No. 61, Museum of Anthropology, University of Michigan.
- Wormington, H. M.
1955 *A Reappraisal of the Fremont Culture with a Summary of the Archaeology of the Northern Periphery*. Proceedings of the Denver Museum of Natural History No. 1. Denver, Colorado.
- Yentsch, Andrew T., Joel C. Boomgarden, Shannon Arnold, and Jerry D. Spangler
2010 *Archaeological Investigations in Range Creek Canyon, Utah*. Report of the University of Utah Archaeological Field School 2005–2006. Utah Museum of Natural History, Salt Lake City.

APPENDIX L.

Selected Color Photographs from the Canyonlands Archeological Project

All of the color photographs included here were taken by field crews on the Canyonlands Archeological Project between 1985 and 1990.



L-1. View of Devils Lane, Grabens Area.



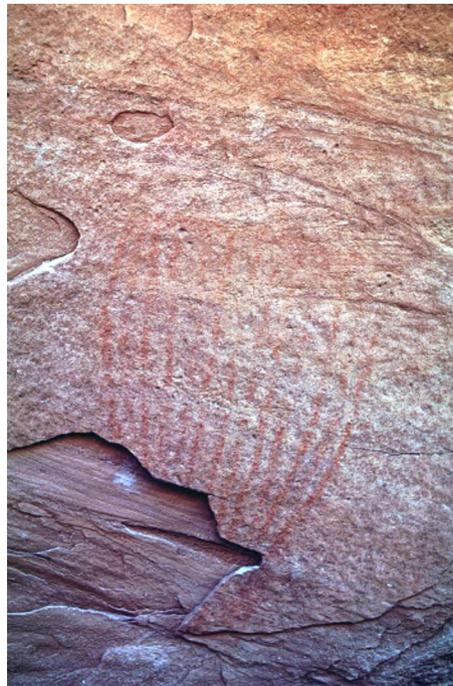
L-2. Inventory crew in Salt Pocket area, Lower Salt Creek Area.



L-3. Inventory crew in the White Crack Area.



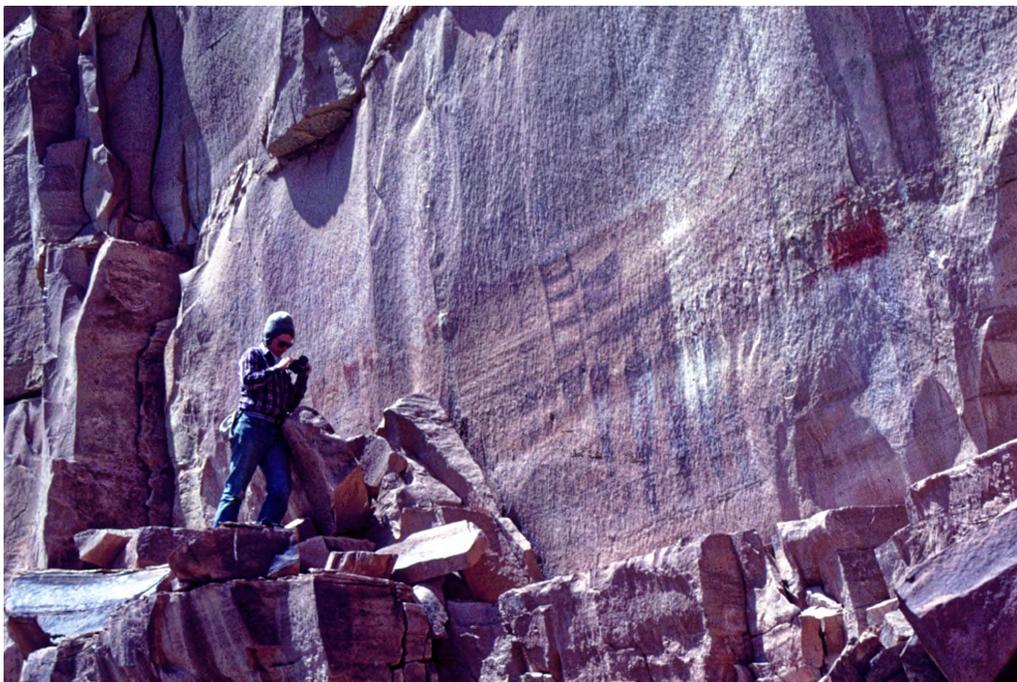
L-4. Inventory crew in Upper Salt Creek Area.



L-5. Barrier Canyon Style anthropomorph, Lower Salt Creek Area, site 42SA17092.



L-6. Rock art, Grabens Area, site 42SA17106.



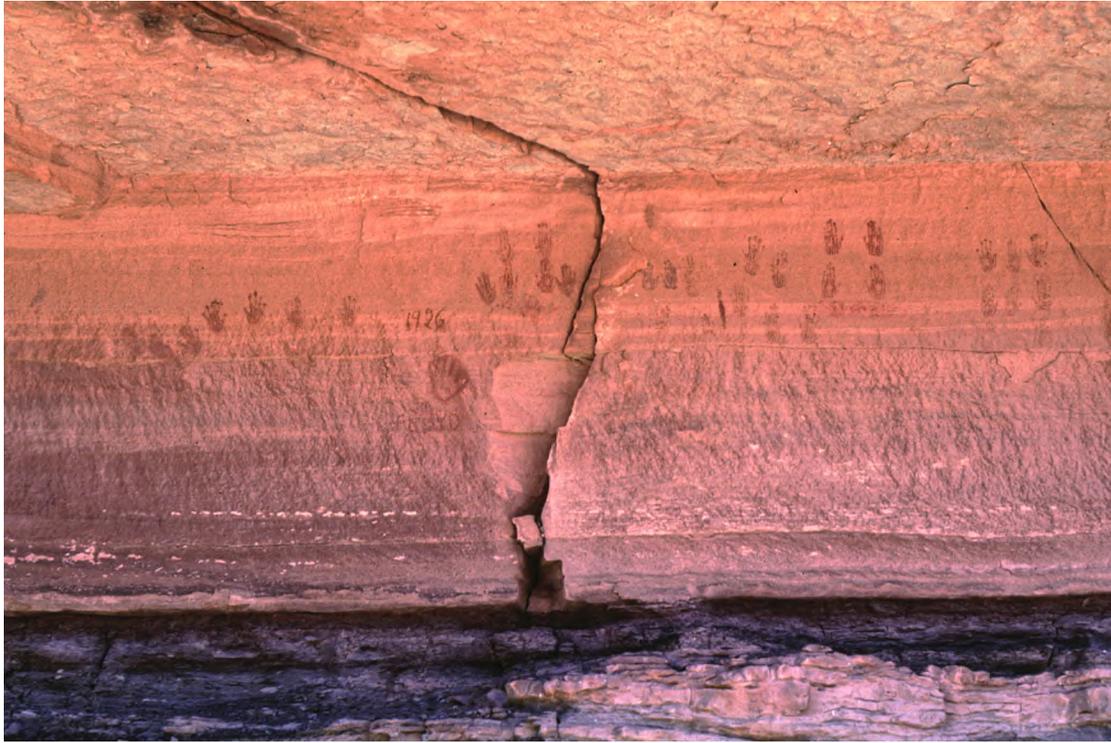
L-7. Barrier Canyon Style rock art, Grabens Area, site 42SA1996.



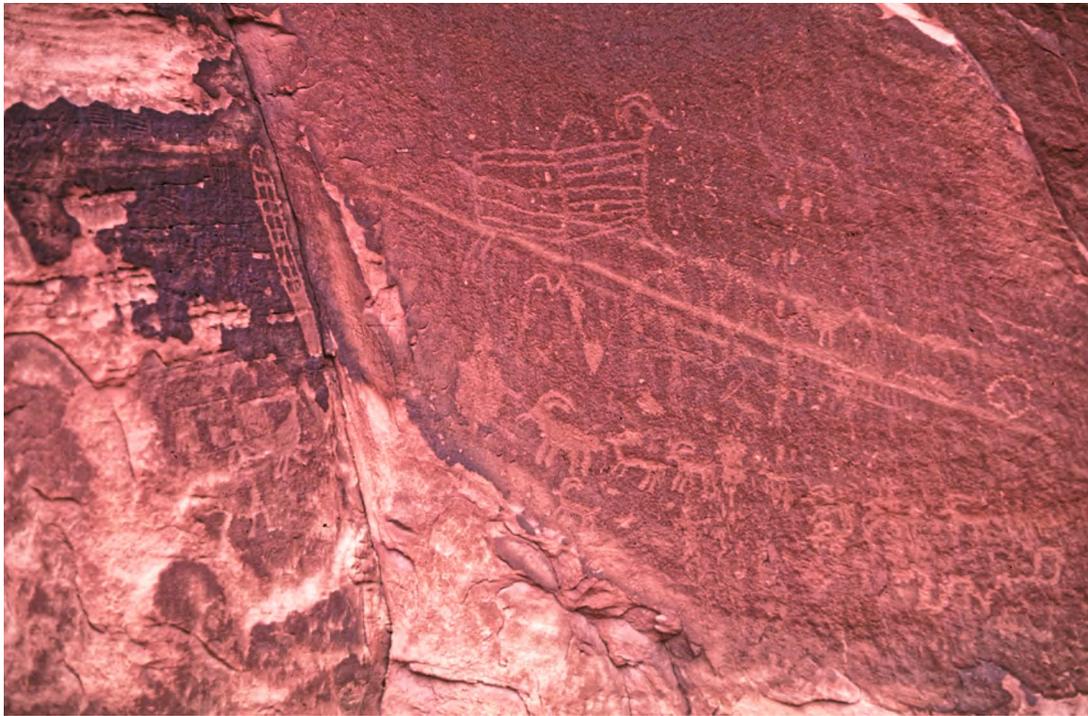
L-8. Barrier Canyon Style rock art, Grabens Area, site 42SA16825.



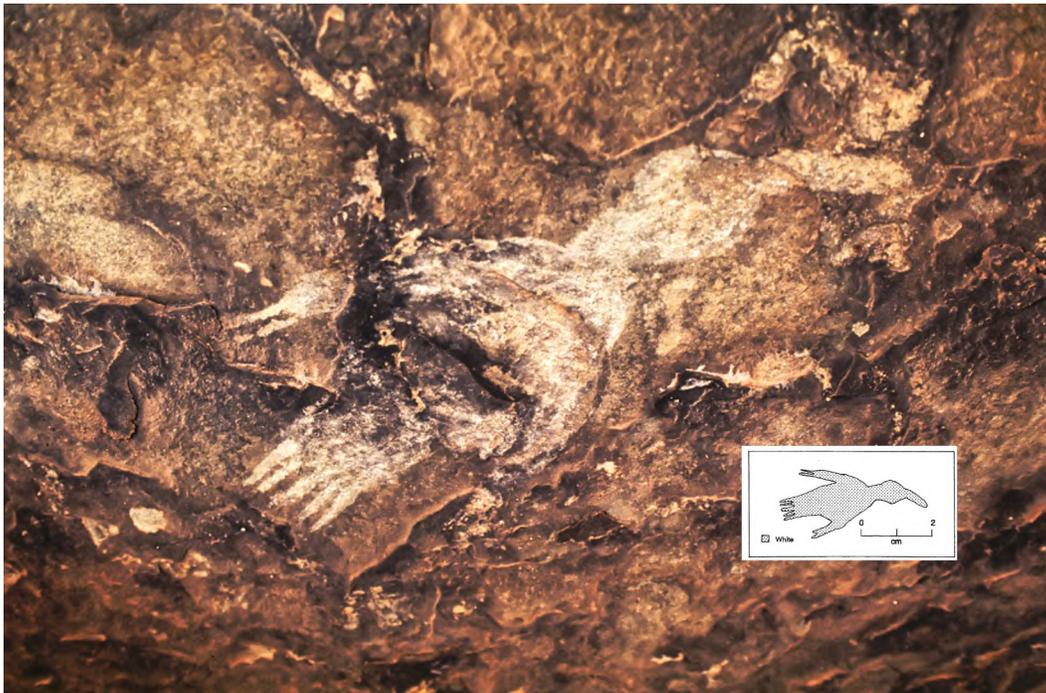
L-9. Canyonlands Anasazi style rock art, Grabens Area, site 42SA1450.



L-10. Canyonlands Anasazi style rock art, Grabens Area, site 42SA1450.



L-11. Rock art, Grabens Area, site 42SA17187.



L-12. Pictograph of the eponymous bird, White Bird Shelter (42SA20615), Lower Salt Creek Area.



L-13. Anasazi hand prints, Lower Salt Creek Area, White Bird Shelter (42SA20615).



L-14. Close up of a negative Anasazi hand print, Lower Salt Creek Area, White Bird Shelter (42SA20615).



L-15. Barrier Canyon Style anthropomorph with a superimposed Anasazi hand print, Lower Salt Creek Area, White Bird Shelter (42SA20615).



L-16. Barrier Canyon Style rock art with superimposed Anasazi hand prints, Lower Salt Creek Area, White Bird Shelter (42SA20615).



L-17. Barrier Canyon style rock art panel, Lower Salt Creek Area, White Bird Shelter (42SA20615).



L-18. Rock art, Lower Salt Creek Area, site 42SA20268.



L-19. Habitation site, Upper Salt Creek Area, site 42SA1581.



L-20. Masonry structure, Upper Salt Creek Area, site 42SA1581.



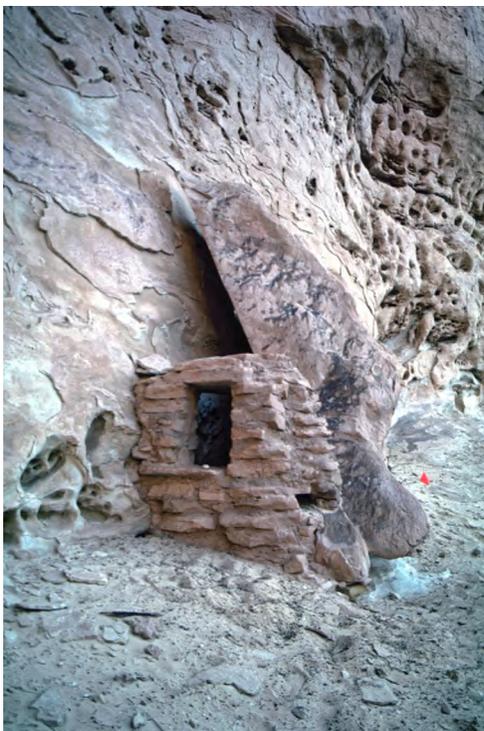
L-21. Field crew recording structures, Upper Salt Creek Area, site 42SA1581.



L-22. Granary under overhang, Upper Salt Creek Area, site 42SA17810.



L-23. Grinding slicks and sharpening grooves, Upper Salt Creek Area, site 42SA17823.



L-24. Masonry structure, Upper Salt Creek Area, site 42SA21108.



L-25. Grinding slicks, Upper Salt Creek Area, site 42SA21120.



L-26. Habitation site, Upper Salt Creek Area, site 42SA21120.



L-27. Grinding slicks and unused rough outs, Upper Salt Creek Area, site 42SA21125.



L-28. T-shaped doorway, with shaped masonry slabs, Upper Salt Creek Area, site 42SA21108.