Promontory–Fremont Contact and

Ethnogenesis in the Post-Formative Eastern Great Basin

by

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A thesis submitted in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

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ABSTRACT

In the mid-13th century AD, small bands of people affiliated with the archaeologically known Promontory Culture and Fremont Complex resided in close geographic proximity on the west side of Promontory Point, Utah. The timing of this co-residence corresponds with significant changes that were occurring simultaneously elsewhere near the shores of the Great Salt Lake, associated with a brief efflorescence of communal bison hunting. Often interpreted as a cultural replacement, high-resolution archaeological data on the Fremont–Promontory transition in the eastern Great Basin have proven elusive but are captured at sites on Promontory Point. This study focuses on the intensive occupation by the bison-hunting Promontory people at Promontory Cave 1 and the previously unreported site of Chournos Springs, occupied by wetlands-foraging Fremont people. Impacts of culture contact are evident at both locales—Fremont influence on the Promontory and Promontory influence on the Fremont—that show efforts at social recruitment by the Promontory people and the perdurance of Fremont social identity, especially as evidenced by subsistence patterns and women's craft production.

While ancestral Southern Dene influences are clear in the record from Cave 1, interactions in the Great Salt Lake area do not appear to have been the Promontory people's first contact with the Fremont. Ethnogenetic processes that can be linked to earlier association with Uinta Fremont in the northernmost Colorado Plateau preceded the interactions with Great Salt Lake Fremont seen on Promontory Point. Both the Uinta and Great Salt Lake Fremont are likely progenitor populations of the modern-day Kiowa,

possibly prior to their divergence from other Tanoan-language speakers (i.e., Proto-Kiowa-Tanoans). Thus, though the Promontory archaeological record is informative of at least two stages in the differentiation of Southern Dene identities west of the Rocky Mountains, it is equally evident that culture-historical developments in the Late Prehistoric Great Basin, a period known as the Promontory Phase, cannot be construed as a purely Proto-Southern Dene phenomenon. Contact and alliances between Southern Dene and Kiowa-Tanoan ancestors may be imperative in understanding the emergence of diverse and widespread Diné and Ndee groups across the Southwest and Plains by the mid-16th century, the implied bonds of kinship that facilitated Kiowa social access across the Continental Divide as communal bison hunters, and the prehistoric origins of the longstanding association between the Kiowa and the Kiowa Apache.

Preface

In the fall of 2009, I had the good fortune to attend a workshop hosted by Bruce Starlight on the Tsuut'ina Nation, just outside Calgary. This was my introduction to the world of inquiry surrounding the origins and history of the Dene. Here, as Elders, ceremonialists, community leaders, and academics conversed, I heard for myself how, though sounds and meanings are often subtly changed, the languages of Northern Dene groups such as the Dënesųłiné (Chipewyan), Gwich'in (Kutchin), and Tłı̨chǫ (Dogrib) are broadly intelligible to members of Southern Dene groups such as the Diné (Navajo) and several Ndee (Apache) nations, and vice versa. Presumably this also extends to Pacific Coast Dene languages that are now scarcely spoken such as that of the Na:tinixwe (Hupa), and to languages that are now extinct, like that of the people known only as the Nicola or *Stuwix*, a Secwepemc term for 'strangers.' I find myself drawn to this last exonym, which must apply, at some point, to all people who find themselves surveying new territory for the very first time. In contact scenarios, we always begin as strangers.

That the Dene share common origins in the Subarctic is now widely accepted, though challenges remain in reconciling archaeological and linguistic evidence for migration with oral traditions that do not necessarily bear record of northern origins. To speak of migration, however, is not to posit the mass movement of a single body of people, or the replacement of one group by the next. Rather, it can also be to explore the historical exchanges between newcomers and those already living in the places where they arrived. Migration can represent one among many of a people's ancestral histories, to be considered in accompaniment with the histories of those who were already there. Indeed, it is reasonable to challenge the supposition that migration can be *the* history of a people. In this vein, although Dene migration is quite germane to the work I will present in the following chapters, the brunt of this study focuses not on the fact of migration, but on the many facets of human interaction that accompanied it, how those interactions came to be reflected in expressions of material culture, and what these patterns may tell us about people's changing self-held identities over time.

The idea of returning to Utah's Promontory Caves was still nascent at the Dene migration workshop in 2009. That is where I first heard Dr. John W. (Jack) Ives's proposal to assemble a team of scholars and revisit Julian Steward's claim that ancestors of the Southern Dene may have used the caves as a waypoint in their southward migration. This proposition became a reality in the spring of 2011, when landowners George and Kumeroa Chournos extended their warm welcome to Dr. Ives, Dr. Joel Janetski, and the rest of the Promontory research team to commence renewed excavations at Promontory Caves 1 and 2. So began the first of several expeditions to Promontory Point, camping on the remote Chournos family grazing lands on the windswept shore of the Great Salt Lake, long hikes each day up the mountainside to the caves, leisurely evenings around the campfire, and the most spectacular displays each night as the sun dipped behind the Hogup Mountains on the far side of Gunnison Bay.

It has been my great privilege to be with the Promontory project from the start, beginning as a field assistant with test excavations in Cave 1. Early on, large numbers of split cane dice—more than could have been anticipated from Steward's report—began turning up in our work, and Dr. Ives set me the question of how the abundant gambling material might matter in the migratory setting of the caves. I accepted his offer to pursue a doctoral program of research the following year and returned to Promontory Point in both 2013 and 2014 with an eye towards answering his question.

It is precisely the nature of gambling games as a partnered activity that necessitates that this study cannot be a matter of Dene migration alone. The ways in which that is true only became clear as this work unfolded: I would like to acknowledge here a debt of gratitude to Kumeroa Chournos, who in the very first days of the project pointed out to us the many scatters of artifacts on the surface around our campsite on the lakeshore, which included potsherds that were typical of both the Promontory Caves and the Great Salt Lake Fremont. Could these two populations have been contemporary, and was the intensity of gambling activity at Cave 1 just one sign of the degree to which they interacted? As my attention turned to both differences and similarities between the people who resided at the caves and those who lived at the site we came to call Chournos Springs, I became increasingly convinced that the fate of the Fremont was inextricably linked to that of the Promontory.

This thesis comprises one part of a much larger research collaboration on Promontory Point. Excavations at Promontory Cave 1 were directed by Dr. Ives and at Cave 2 by Dr. Janetski, while I oversaw the excavations at Chournos Springs that are briefly reported on here in Chapter 5. This work is not intended to serve as a complete report of the findings at these sites. Data analyses reported in this study are my original work, with the assistance of Christine (Edmunds) Dinkel in the cataloguing and identification of the Chournos Springs faunal assemblage, Cody Sharphead in cataloguing and identification of lithic specimens from excavations there in 2014, and Michaela Stang with the photography of artifacts collected in 2014. Contributions of other members of the Promontory research team in the preparation of maps and figures are noted in the text.

Chapter 6 of this thesis is a condensed version of two papers that have been published in *Prehistoric Games of North American Indians: Subarctic to Mesoamerica* (edited by Barbara Voorhies, University of Utah Press, Salt Lake City, 2017). Sections on gambling and reciprocity, prestige gambling, and decision making under risk are from Chapter 7 of that volume, while the extensive discussion of the gaming assemblage from Promontory Cave 1 and 2 and its implications for a migratory population is from Chapter 9, co-authored with Dr. Ives.

Notes on terms

Readers will note that throughout this work, exclusive usage is made of the term Dene instead of Athapaskan or variants thereof. The latter is an exonym of American origin, coined by politician and linguist Albert Gallatin (1836) out of a desire for a convenient term for the speakers of a group of closely related Subarctic languages who themselves went by no single unifying name. Gallatin thus "designated them by the arbitrary denomination of Athapascas" (Gallatin 1836:17), drawing from a prominent lake marked on fur trade-era maps in "Cheppeyan" (Dënesųłiné) territory. While he knew of a single outlying group on the northern Plains, the "Sussees" (Tsuut'ina) (Gallatin 1836:4), information on the Indigenous languages of the Spanish and, by that time, Mexican territories of Nuevo México, Texas, and Californias had yet to reach Washington. Gallatin was therefore unaware of southern members of the language family; if he had been, it is unlikely he would have chosen a northern water body as a central geographic reference.

The name of Lake Athabasca is itself an anglicization from an entirely unrelated Algonquian language, Nīhithawīwin (Woodlands Cree). The mapmaker to whom propagation of the term can most directly be attributed, Hudson's Bay Company surveyor Philip Turnor, explained in 1791 that "Athapescow in the Southern Indian tongue signifies open country such as lakes with Willows and grass growing about them or swampy land without woods" (Turnor 1934:400; cf. the more poetic 'where there are plants distributed in a net-like pattern,' Krauss 1987:105). The lake's name was already current among Canadian traders (i.e., North West Company men from Montréal and environs) by the time of Turnor's reconnaissance in 1790–91. To Turnor goes the credit, however, as his work was sent to London, where it was included in Aaron Arrowsmith's (1802) widely consulted maps detailing exploration of the Americas. Turnor (1934:400) explicitly noted that the Dënesųłiné did *not* refer to the lake by this name or its equivalent in their language; the same can be said, with emphasis, of using the term 'swampy' for themselves as a people. Use of Athapaskan today amounts to no more than a lexicographical accident.

While a "for better or worse" acceptance of Gallatin's admittedly arbitrary designation has long prevailed in some academic circles (Krauss 1987:106), use of the term

Dene is gaining consensus as a more suitable self-referent. The 2009 and 2017 Dene Speaker Symposiums hosted by the Tsuut'ina Nation are but one example; since 2012, the former Athabaskan Languages Conference, an annual meeting of speakers, linguists, and policy makers, has also been transitioning to the name Dene Languages Conference (Dene Languages Conference 2018). Its acceptance stems from the work of linguist Edward Sapir (1915:588), who noted, "*Dene*, in various dialectic forms, is a wide-spread… term [in this family of languages] for 'person, people'." It follows that to say "Dene peoples" would be somewhat redundant, and that use of the term Dene here encapsulates many distinct groups. It is not to be confused with Na-Dene, a broader, contested language family proposed by Sapir to also include Haida, Tlingit, and later Eyak in which *na* was identified as another cognate for 'people' (Krauss 1986:164; Sapir 1915; cf. Campbell 1997; Leer 2010). It is also acknowledged that the term is not universally accepted—Dene may seem closer in form to Diné (Navajo) than to Ndee (Apache)—but it is preferred here for its Indigenous origin and its proximity to the proposed parent form [dənɛ'] (Dene Languages Conference 2016; Krauss 1987:105).

The Dene can further be subdivided according to geographic area. In this work, reference to Northern Dene, Southern Dene, and Pacific Coast Dene is made. Apache, a synonym for the Southern Dene, is also fraught as an exonym of non-Indigenous origin, though it remains in common use as a self-referent by all except the Diné, who were historically included in early Spanish accounts under the term. In 2013, leaders of six Southern Dene nations signed the *Ndee Iłahík'ai/Nnee Iłahík'ai* ('Apache People Joining

Together', or Inter-Apache Policy on Repatriation and the Protection of Apache Culture). In keeping with this agreement's terms, the six parties are individually referred to as the Chiricahua, Jicarilla, Lipan, Mescalero, Western Apache, and Kiowa Apache in this work, while Ndee is used to refer to them collectively (Welch 2000; Welch et al. 2017:497–500). The relationship of Kiowa Apache to the other Ndee groups, and confusion over which groups the ambiguous term "Plains Apache" could refer to, are discussed in Chapter 3 of this text. Recognizing that the emergence of these groups likely reflects several points of divergence, the term Proto-Southern Dene is used here to refer to ancient groups who, midway through the journey of migration, were ancestral to both the Diné and the Ndee.

Acknowledgements

I would first like to thank George and Kumeroa Chournos, on whose land the Promontory Caves are located. Without their incredible hospitality and support, neither the Promontory research project nor my own part in it would have been possible. I have already mentioned my debt of gratitude to Kumeroa for drawing our attention to the site at the springs they have always used as the base of their sheep ranching operation there on Promontory Point. I would also like to extend my thanks to the late Sam Chournos and family for extending permission for me to investigate this locale further. The decision to give the name Chournos Springs to the site has been made in both families' honour.

This work is very much a testament to my doctoral supervisor Jack Ives' patience and wise counsel over these last several years. As a neophyte in the world of Great Basin archaeology, I have also benefited greatly from the guidance of Joel Janetski. It is on the considerable foundation of their scholarship that the Promontory project is built, and to this I hope I have written a worthy addition.

The list of people who have contributed time, labour, and other assistance since my studies began is a lengthy one, and I am afraid with the passage of time a few names might now be missed. However, for help both in the field, often under very trying conditions, and beyond, many thanks are due to Kisha Supernant, Sally Rice, Brooke Arkush, Jaclyn Eckersley, Jen Hallson, Aileen Reilly, Reid Graham, Courtney Lakevold, Conor Snoek, Risa Piper, Cody Sharphead, Katie Richards, Lindsay Johansson, Lisbeth Louderback, Michaela Stang, Andrew Lints, Christine Edmunds Dinkel, and Vandy Bowyer.

Technical assistance at various stages of this study has generously been provided by Duane Froese, Joan Coltrain, Kathy Puseman, and Hector Neff.

For several months, the Museum of Peoples and Cultures in Provo, Utah, was my home away from home; Paul Stavast, Lane Richens, Richard Talbot, and James Allison were most gracious hosts. Likewise, thanks are owed to Glenna Nielsen-Grimm at the Natural History Museum of Utah and Amy Commendador at the Idaho Museum of Natural History for facilitating my collections-related work, sometimes on very short notice.

My work has been enriched by many enlightening conversations; in addition to those mentioned above, I would in particular like to thank Jody Clauter, Sunday Eiselt, Kevin Gilmore, Ruth Gruhn, Sister Juanita Little, Sandeep Mishra, Rita Shaffer, Dave Snow, Bruce Starlight, Henrietta Stockel, David Hurst Thomas, Sarah Trabert, and David Yoder for sharing their thoughtful insights and knowledge.

Funding for this research was provided by the Social Sciences and Humanities Research Council of Canada and by the Alberta Gambling Research Institute, with additional support from the Department of Anthropology at the University of Alberta and the Canadian Museum of History.

This work is dedicated to my wife Kelly and our son Will. Putting the last of these chapters behind us, it is ours alone that now lie ahead.

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INTRODUCTION

Evidence from the ongoing program of research at the Promontory Caves, on a mountainous and sparsely settled peninsula projecting from the north shore of the Great Salt Lake, Utah, points to their inhabitation by a migratory population with ancestral ties to Dene from the Canadian Subarctic (Ives 2014). The remarkably well-preserved deposits of perishable and non-perishable artifacts in the caves, almost two meters deep in some places, form a nearly complete record of material culture for what Julian Steward (1937*a*) termed the Promontory Culture. At the largest cave, Promontory Cave 1, an extensive series of high-fidelity ^{14}C dates points to a peak in occupation from AD 1247-1291, with earlier periods of habitation possibly dating prior to AD 1200. These are the earliest known dates for the Promontory Culture (Ives et al. 2014; Yanicki and Ives 2017), placing their arrival in the northern Great Basin at a time when the region was still inhabited by the declining—and, from a social, ethnic, and linguistic perspective, enigmatic—Fremont Complex (Coltrain and Leavitt 2002; D. Madsen and Simms 1998).

Who were the Promontory? Who were the Fremont? The central thesis of the present work is that Promontory-Fremont contact in the mid-13th century AD represents a moment of ethnogenesis in both Proto-Southern Dene and Proto-Kiowa-Tanoan prehistory. In addition to identifying the conditions under which intergroup contact could take place and what evidence exists for it, this work explores the implications of association between members of the Promontory and Fremont cultural traditions and the possibility of linking them to descendant peoples in the present day. Through prolonged, positive interaction, changes to both cultural systems took place that were founded in the alliance-seeking imperatives of communal bison hunters new to the Great Salt Lake region, and that were characterized by a high degree of member exchange and the coalescence of stylistic traditions. While intriguing hints of Promontory–Fremont interaction can be found in the oral traditions and archaeology of the Southern Dene as a whole, particular attention is given here to the historic association of the Kiowa Apache and the Kiowa proper, emphasizing the importance of Great Basin prehistory in the origins of these latter groups.

Three broad characterizations of Promontory-Fremont interaction discussed in this work are summarized as follow:

1. Relative disparities in status, owing to differential success of preferred subsistence strategies, existed between Promontory and Fremont peoples at the time of contact. This disparity skewed in favour of the Promontory, but may have been short-lived.
2. Individuals from Fremont groups, and particularly women, were actively recruited into Promontory society. Sociodemographic movement of individuals in the reverse direction is also possible, but influence on Fremont society may more likely have been in the realm of the movement of information and ideas: emulation and aspirational changes away from a long-held, semi-sedentary hunter-gatherer way of life.
3. Social and ideological shifts accompanied this interaction. These may reflect an early stage of the elaboration of Puebloan-influenced cosmology and

ceremonial life in ancestral Southern Dene societies, and a transition among Fremont descendants to a Plains-based, bison-focused economy (cf. Ortman 2012; Ortman and McNeil 2017).

While Fremont–Promontory relationships have long been suspected, their nature has been contested. Cross-cultural interaction (Steward 1937*a*), intra-cultural variability (Aikens 1966), adaptive development (D. Madsen and Simms 1998), and cultural replacement (Janetski 1994; Janetski and Smith 2007) have all been proposed, while verification and refinement of these hypotheses has been stymied by a paucity of sites featuring reliable stratigraphy and dates documenting the Fremont to Late Prehistoric transition (Madsen 1975, 1994). Evidence for the crucial period of contact during the Promontory Caves' inhabitation is not lacking on the Promontory Peninsula, where contemporary Fremont settlement occurred. I submit that post-Fremont (and indeed, post-Promontory Caves) assemblages from the Wasatch Front and Utah Valley variously referred to as Late Prehistoric (D. Madsen and Simms 1998; Simms and Heath 1990) or Promontory Phase (Janetski 1994; Janetski and Smith 2007) from the 14th–16th centuries AD represent emergent, transitory cultural identities linked as later manifestations of the period of interaction that I identify here. Furthermore, later material from the Great Plains falling within the Dismal River tradition (e.g., Gilmore and Larmore 2012; Trabert et al. 2016) may bridge the gap between the archaeological record of the northeastern Great Basin and the ethnographically attested histories of descendant peoples.

The relationship between Promontory and Fremont presented here should not be seen as a linear and monolithic progression, but rather combinations and recombinations of loosely affiliated groups. Two specific, probably band-level populations are the focus of this study: the people at Cave 1, and the people who lived at the nearby site of Chournos Springs both before and after the caves' peak occupation. Nor should the associations with descendant groups presented here be seen as exclusive: I do not assert that the Promontory simply became the Kiowa Apache, nor that the Fremont simply became the Kiowa, though ancestors of both peoples can likely be found in each. Indeed, there are many indications that social complexity in the eastern Great Basin of the 13th century was far greater than that of two populations interacting with each other.

Use of the term Fremont here denotes a widely distributed complex of peoples with broad similarities in subsistence, residence patterns, and material culture, but also strong geographic distinctions, and likely includes ethnically and linguistically diverse peoples (D. Madsen and Simms 1998). Fremont diversity is of considerable importance in making sense of the Promontory assemblages. Traces can also be found of proximity to peoples of the desert west, at the outermost limits of Fremont influence, though ties in that direction to Proto-Numic-speaking peoples, who were not yet established on Promontory Point ca. AD 1200–1300, are beyond the scope of this work.

Theoretical Background: Cultures, Ethnicity, and Ethnogenesis

If we are to understand conditions on Promontory Point in the mid- to late-13th century as representing two cultures in contact and then investigate the interaction that ensued, it is perhaps best to begin with a definition of what exactly culture is, and what archaeological cultures are. In a broad sense of what culture is in general, it is Peter

Richerson and Robert Boyd's (2005*a*:5) definition that I follow in this work: "culture is information capable of affecting individuals' behavior that they acquire from other members of their species through teaching, imitation, and other forms of social transmission." This definition captures the historical context of how culture is transmitted: culture is *learned*, shared by individuals within and across social groups, and from whom and how we learn it are central to the phenomenon.

Cultures, in the plural sense, have a slightly different, but associated meaning as a core unit of study in North American archaeology, defined through the identification of discrete and comparable groupings of preserved artifact assemblages, especially manufactured items such as stone tools or pottery, in turn classified when possible into *types*. In the unwritten past, these are the remaining physical traces of the information that was socially transmitted between and among societies. Cultures, in this sense, are effectively archaeological shorthand for ancient ethnic groups, or "peoples" (Childe 1929:v–vi; Trigger 2006:241–248). Identification of changes in types over time, ordering them into chronological series, and mapping their changing distribution over geographic areas, is the practice of *culture history*, by which the prehistory of groups of people can be observed. Identifying continuity beween archaeologically known cultures and their modern-day descendants, drawing upon written and oral history, ethnography, and other data sources, is a further goal of culture history.

Any cluster of distinct attributes recognized as a prehistoric culture is inherently etic. That is, it is the product of external observation, generally within the Western scientific tradition. Cultures so described, though, are not tethered to the internal, or emic, understandings of identity and social organization held by the makers of the material cultural record, for we people do not organize ourselves in terms of "culture." We instead use any number of other terms to identify ourselves based on shared social, geographic, linguistic, and religious ties. All of these emic aspects of identity together, combined and recombined in various permutations depending on the heterogeneity or homogeneity of the backgrounds of the individuals in a given group, comprise the palimpsest of outward-facing attributes that can collectively be defined as culture(s).

Commonality in self-identified social groupings, as reflected in endonyms that refer to one's own group as "people," can be usefully distinguished from the externally categorizable attributes on which these groupings are based as the difference between ethnicity and culture. Ethnicity so described is a relational term, for by labelling one's own group membership, one must necessarily define what it is not (Jenkins 1997; Roosens 1989; Voss 2008). An "us," or in-group, versus "them," or out-group duality emerges. While all etic cultures are to a degree provisional constructs that intersect more or less approximately with self-held ethnic identities, classification of ethnicity or culture is not simply an academic exercise of labeling territorial boundaries (i.e., "thinking like a state," cf. Hu 2013:373; J. Scott 1998). Rather, our participation as members of some social groups and not of others is an essential aspect of the lived human experience.

It has long been recognized that artifact assemblages, language, and other cultural attributes do not co-occur in identical distributions, just as cultural traits are not distributed in lock-step with genes (Barth 1969; Clarke 1968:363–404; J. Hill 1996; Hodder 1978:4, 12–13; Moore 1994*a*:939; Ortman 2010*a*, 2012; Renfrew 1993:23–27;

Terrell 2001; Willey and Phillips 1958:53). While it is a relatively straightforward task to distinguish changes in material culture over time, recognizing differences in the self-held identities possessed by group members themselves is a more nuanced endeavour. In the case of ancient hunter-gatherer populations in North America, indentifiable material culture patterns that extend over broad regions and time periods are in all likelihood too coarse a unit of analysis for ethnic realities, especially when discussing non-perishable artifact types that could be manufactured by members of different social groups. Some artifact types likely *do* correspond with their makers' signaling of identity (a few examples are discussed in Chapter 2), but ascertaining which ones requires additional insights. The most meaningful understandings of past populations as ethnic groups can be arrived at by considering the interplay between material culture and other lines of evidence—linguistic, genetic, and ethnohistoric.

Culture history is, of course, not the only topic of interest that can be examined in the archaeological record and has been challenged on many grounds. Typological classification and the description of cultural assemblages can seem stale topics of discussion when interests turn, for instance, to more generalized insights about human behaviour, the relationship between human groups and their environments. However, when considering accountability to Indigenous societies whose ancestral heritage the archaeological record represents, the study of cultural traditions is no trivial matter. While functionalism, economic and environmental matters of subsistence and ecology, and the nature of cultural evolutionary processes are useful in addressing questions of how and why cultural change occurs, to characterize human culture simply as an adaptive response to environmental pressures and the optimization of resources is insufficiently anthropocentric (R. Hall 1977). As noted by Gordon Childe, one of the great thinkers in culture-historical archaeology, "humans do not adapt to the world as it really is but the world as people imagine it to be" (Trigger 2008, citing Childe 1949:6–7). Symbolism and the meaning artifacts held to their makers, and differences in worldviews and value systems have played a significant role in the emergence and persistence of cultural variation. Rather than presuming universals of human behaviour, an understanding of the past requires highly contextualized knowledge, approaching culture as the product of information shared by members of individual societies themselves. An ideal synthesis of the psychological, social, and ecological constraints on human behaviour requires an understanding of what culture meant to its bearers, recognizing the contextual utility of culture history.

The concept of ethnicity is related to individual agency, each person being what British archaeologist David Clarke (1968:363) described as "a node at the intersection of social, material, linguistic, and genetic sets, each operating in different attribute dimensions, categorizing different aspects of the same populations." It is the actions of individuals that serve as the true drivers of culture change, considered here as *ethnomorphosis*—that is, changes associated with people's maintenance of ethnic identity, their involvement in emerging forms, and their abandonment of yet others (following Hu 2013; Kohl 1998:232; Voss 2015). Ethnomorphosis emphasizes the fluidity of emic, self-held aspects of identity as the basis for how the material record is meaningfully patterned and constituted. From an etic perspective, these changes may be viewed as processes of cultural evolution but emphasizing the primary agency of individuals and context-dependent histories of social groups. Individuals with different ethnic backgrounds can co-reside in single groups or possess mixed ethnic identities themselves. Over the course of a lifespan, one's own ethnic identity may also undergo change. Fredrik Barth's (1969) assertion that societies are inevitably polyethnic, by virtue of the development of social groups through interaction with others, may be too extreme a view—social groups can maintain identity through isolationist practices (Royce 1982:38–39) and social preferences for endogamy can minimize out-group contacts (Ives 1990; see discussion in Chapter 4)—but even when maintained through avoidance of others, ethnicity is a product of intergroup negotiation.

The theoretical processes by which new cultural identities are formed have frequently been addressed in the literature on cultural evolution; these processes are equally applicable to ethnomorphosis. Two hypotheses are generally described: on the one hand are processes of divergence, wherein as a group grows, it splits and members of the new group seek to distinguish themselves from the parent group (Steward 1955*a*). Such progressive differentiation of forms is effectively descent with modification (O'Brien and Lyman 2003), with connotations, when modelled over time, of tree-like branching in the stylistic forms of one generation to the next. On the other are processes of social interaction and associated exchanges of information, which instead of drawing apart features the coalescence of cultural expressions, including material styles (Barth 1969; S. Jones 1997; R. McGuire 1982; Stark 1998; Voss 2015:656). These two hypotheses have variously been termed "demic diffusion" and "cultural diffusion" (Ammerman and Cavalli-Sforza 1984; Cavalli-Sforza *et al* 1988, 1994), "branching" and "blending" (Shennan and

Collard 2005), or “phylogenesis” and “ethnogenesis” (Moore 1994*a*, 1994*b*), the latter two terms being used in this work, as defined below:

> According to the phylogenesis hypothesis, the similarities and differences among cultures are primarily the result of cultural assemblages dividing as the communities that produce them repeatedly split, grow and then split again.... [A]ccording to the ethnogenesis hypothesis, the patterns of similarity and difference among cultural assemblages are chiefly a consequence of individuals copying each other’s practices, exchanging ideas and objects, and marrying one another. [Collard and Tehrani 2005:109]

Whereas in the phylogenetic model, cultural hybridization is impeded by strong barriers including language differences, ethnocentrism, and intergroup conflict (Durham 1992), ethnogenetic models typically consider boundaries between tribes and nations to be “fuzzy”, resulting in “a constant flow of people, and hence their genes, language, and culture” (Moore 2001:51) between them.

Significant methodological differences have been proposed for modeling phylogenesis and ethnogenesis, with the phylogenesis hypothesis predicting that “similarities and differences among cultures can be represented by a cladogram” (Collard and Tehrani 2005:110; also see examples in Mace et al. 2005), while in the ethnogenesis hypothesis, it is considered unrealistic “to think that history is patterned like the nodes and branches of a comparative, phylogenetic, or cladistic tree” (Terrell *et al* 1997:184), and instead, reticulated graphs or maximally connected networks can best represent cultural variation (Terrell 2001). The difference between phylogenetic and ethnogenetic change can be reasoned beyond consideration of how stylistic patterns of material culture reflect quantity and quality of intergroup contact. Phylogenetic processes of change should be the result of isolationist practices that also imply strong associations between culture, language, and genes, while a higher frequency of intergroup interactions should result in unpredictable variations in these factors (Collard and Tehrani 2005:110). Thus while I earlier noted that language and material culture do not change in lock-step with genes, the phylogenetic hypothesis in general, and specific cultural practices such as endogamous local-group growth (Ives 1990, 1998; see Chapter 4), suggest cases where they *are* more likely to be strongly associated with each other.

Phylogenesis and ethnogenesis should not be construed as rival hypotheses; instead, Stephen Shennan and Mark Collard (2005:135) suggest "there is a continuum of possibilities with regard to the relative importance of branching and blending processes." By this same token, vigilance should be exercised against assuming phylogenetic models of change by default: historical, cladistic reconstructions of language and culture alike can mistake recent occurrences of sharing, or horizontal transmission, for vertical inheritance and ancestral origin (R. Clark 1979:263; Irwin 1992:195–204; T. Hunt et al. 1998). The challenge remains to determine how they can be distinguished, which is connected to questions of how cultural information is acquired, both vertically and horizontally—specifically, the extent to which traditions co-evolve with each other, either as blocks of coherent units or through inheritance and transmission of discrete traits (Shennan and Collard 2005:133).

Caution is also required in interpreting new forms of material culture as evidence of the emergence of a new ethnic identity. Precisely because variability is normal within populations, emphasis on what is "new" can obscure the persistence and continuity of existing identities (Hu 2013). Barbara Voss (2015:665) notes, "since identity maintenance involves continual adjustments to new circumstances, changes in material, symbolic, spatial, and discursive practices alone are not themselves sufficient evidence of ethnogenesis." However:

> Models of ethnogenesis will be best applied to those historical circumstances in which practices of identification are structurally transformed…. [T]hese transformations in social identity are often spurred by substantive demographic shifts—aggregation, disaggregation, displacement, and migration—combined with the emergence or imposition of new structures of power" [Voss 2015:665–656].

In summary, the emphasis of the present work can be seen as culture-historical: its aim is to help draw links between changing archaeological populations and modern-day descendant communities whose heritage can be found, at least in part, in the complicated social dynamics of the late- and post-Fremont world. The role of individuals, and a concomitant variability in the production of material culture both within and between populations, is a central focus. This is foremost a recognition of the fact that cultures do not produce the archaeological record; people do, and it is the accumulated knowledge, skills, beliefs, and expressions of individual identity that manifest in the assemblages left by different social groups. Homogeneity or heterogeneity of group composition likely affects how material cultural traits become more common over time (Ives 1990; Riede et al. 2012; Runciman 2005). Thus while intergroup variability, especially as understood through classic typological analysis, remains an important measure of differentiating cultural units, intragroup variability (the variability within archaeological "types") offers a trove of useful data about how social groups are constituted, how they see (or saw) themselves in relation to others, and how this sense of group identity may have changed over time.

Of final note here, this population-minded approach lends itself well to, and is informed by, the nascent body of work falling under the banner of the Archaeology of Human Experience (AHE; see contributions in Hegmon 2016*a*). Throughout this work, I attempt to emphasize that artifacts and attributes are a reflection of what individuals and groups of people knew and experienced (cf. Hegmon 2016*b*). Furthermore, the discussion of culture contact and culture change in this work draws on the recognition that the conditions of life in the past were not always ideal, and in spite of deeply entrenched value systems, people could find themselves motivated to abandon long-held cultural norms in pursuit of something better. Implicit value judgements of quality of life in this sense need not be at odds with Boasian cultural relativism—the topic of interest in AHE is not a judgment of past ways of life against present values and conditions, but what evidence exists for contemporary "relationships between social norms and values, the institutions they bring into being, and the provisioning of human needs over the long-term" (Ortman 2016:75). How peoples in the past evaluated their quality of life in relation to each other and sought means of bettering it is an important aspect of human experience that is not only within the grasp of archaeological study, but is a means of contributing both to broader knowledge of successful (and unsuccessful) strategies and of advocating the history of descendant peoples (Hegmon 2016*b*:9–11, Ortman 2016:74–75).

Study Overview: Culture Contact on Promontory Point

The structure of this study can be divided into two basic parts. Chapters 1–4 provide the background physiographic, archaeological, and ethnographic data that serve as the basis for the rest of this study, including a review of how this data may tie in to larger questions of Southern Dene and Kiowan ethnogenesis. Included here is also a discussion of the theoretical underpinnings of how ethnic identity can be detected in the archaeological record, and how patterns of identity change can be meaningfully interpreted. Chapters 5–8 present what is new, and what can be added to that existing foundation of knowledge, based on recent findings from the Promontory research program.

A brief overview of the physiographic setting, centred on the study area on the west side of Promontory Point, is provided in Chapter 1. Greater topographic and climatic variability is present in the northeastern Great Basin than might at first be assumed, and regional differences—especially between the east side of the Great Salt Lake, at the foot of the Wasatch Mountains, and the more desert-like west, are of significant bearing on resource availability and how different groups would have lived in this landscape in the past.

Chapter 2 reviews the current state of culture history of Promontory Point and the Great Salt Lake area, including significant questions that remain unresolved, or have been given insufficient attention in the past. This begins with a survey of the historically attested Numic-speaking peoples present in the Great Salt Lake area at the time of Spanish, British, and American contact, which for parts of the region extended into the late 1800s, followed by a review of the archaeological periods into which Great Basin prehistory is divided. In addition to a relatively recent advance of the Numa north and east of the Great Salt Lake, of particular note is what has come to be known as the "Promontory Problem" (Aikens 1966; Forsyth 1986)—in brief, whether the Promontory phenomenon, especially as seen at the caves and at sites in the Bear River wetlands, was separate from or simply a subset of variability within the broader Fremont world. Greatly enhanced resolution to dates for the occupation of Promontory Cave 1 showing Promontory–Fremont contemporaneity (Ives et al. 2014) provides a compelling case for reexamining earlier hypotheses about the Late Prehistoric period in this region (Janetski 1994; Janetski and Smith 2007; Simms 1990; Simms and Heath 1990). At contention is the suggestion that highly organized, large-scale bison hunting—that is, communal hunting—was a routine aspect of life among Fremont peoples of the eastern Great Basin (cf. Grayson 2006; Lupo and Schmitt 1997; Madsen and Simms 1998): rather, a florescence in bison hunting accompanied the Promontory arrival that, while influential, was short-lived. The previous work reviewed here remains of vital importance in understanding what took place after the Promontory Caves were abandoned, but arguments based on the presumption of Promontory–Fremont contact that came to be dismissed as improbable are once again on much firmer footing.

The association between Promontory, Fremont, and descendant peoples cannot be resolved through archaeology alone. Chapter 3 presents additional lines of evidence, including data from population genetics, linguistics, oral history, and ethnohistoric sources, that allow the tentative identification of northeast Fremont variants as Proto-Kiowa the people at the Promontory Caves as Proto-Dene. This includes a discussion of some of the outstanding questions that remain in relation to these hypothesized cultural affiliations, including the social mechanisms by which the ancestral Kiowa could have taken up a communal bison hunting lifestyle, and uncertainty over the identity of Southern Dene groups identified in early historical sources, as well as over the routes by which Dene migration from the Canadian Subarctic to the American Southwest took place.

In Chapter 4, I establish a framework for the archaeological detection of ethnic identity and identity change. Group formation principles revolving around cooperation and competition are seen here as a key to understanding processes of ethnogenetic and phylogenetic culture change, and to making sense of material culture patterns that result from each. Gordon Allport's (1954) *intergroup contact hypothesis* serves as a launching point for this discussion, which argues that positive interactions between individuals from different cultural backgrounds are essential to the establishment, maintenance, and strengthening of social relations over time, while conversely, negative interactions (and even the avoidance of interaction) can reinforce prejudice and intergroup conflict. The intergroup contact hypothesis intersects neatly with Jack Ives's (1990, 1998, 2008, 2010, 2015) theoretical work on Subarctic Dene and other North American indigenous kinship systems, in which preferential valuing of exogamous or endogamous marriage in hunter-gatherer societies creates powerful motivations for individuals to engage in positive or negative out-group contact. It is the emergence of new social identities through positive intergroup contact that can be identified as ethnogenesis, while phylogenesis denotes more limited out-group interactions. A test of the hypothesis that the Promontory Point archaeological record represents a period of ethnomorphosis linked to alliance formation between Proto-Southern Dene and Proto-Kiowa is proposed by laying out three conditions: first, to establish that Promontory and Fremont groups were contemporaneous and *could* have interacted with each other; second, to demonstrate not only that intergroup contact took place, but that it was of such a character as to have promoted the exchange of both individuals and information; and third, to show how new social identities emerged, over time, as a result of this interaction.

Central to the assertion that culture contact could and did take place is the demonstration of the contemporaneity of Promontory and Great Salt Lake Fremont populations. During the Promontory research team's preliminary fieldwork in April 2011, a previously unreported archaeological site, Chournos Springs (42BO1915), was observed at the lakeside camp of the host Chournos family's sheep and cattle ranch. The presence of undecorated, crushed calcite-tempered ceramic sherds typical of the Promontory Caves together with fragments of thin, sand and mica-tempered ceramics typical of the Great Salt Lake Fremont raised the intriguing possibility of coexistence; Fremont-affiliated sites have been heretofore unknown in this vicinity. Chapter 5 summarizes excavation efforts undertaken in 2013 and 2014 at the site we have named, establishing the age of the site and the presence of a population that is fundamentally different from that which inhabited the Promontory Caves. AMS radiocarbon dates from an adobe-lined, semi-subterranean structure range from 980–1270 cal. yr. AD, suggesting occupation by Great Salt Lake Fremont peoples long into the 13th century. Dates for a 20-cm veneer of midden-like materials draped over the buried structural debris, including mixed ceramics and other material suggestive of the post-Fremont Promontory Phase, ca. 1300–1600 (cf. Janetski 1994; Janetski and Smith 2007) could not be determined. Nevertheless, the combination of the structure and extensive overlying debris provides compelling evidence to indicate that a Fremont settlement existed at Chournos Springs at the onset of the Promontory Caves' peak occupation, and that at least occasional occupation of this locale persisted beyond that time.

Contemporaneity of settlement only sets the stage for cross-cultural contact to have taken place. How these two communities interacted with one another, each living in sight of the other and having disparate social identities, entails a careful consideration of how the entangled concepts of identity and identity change can be recognized in the archaeological record. Not previously considered as an indicator of intergroup contact and identity are the ubiquitous quantities of gaming paraphernalia present at the caves, reviewed in Chapter 6. Gambling, which usually accompanied such games, was ethnographically most acceptable between individuals far removed from their respective kin groups (DeBoer 2001:232; Sahlins 1978:195; Yanicki 2014, 2017). These artifacts thus could affirm that the Promontory people were in regular contact with neighbouring, unaffiliated groups, with the settlement at Chournos Springs being a prime candidate. On further examination, an assessment of the Promontory gaming assemblage points not only towards extensive intergroup ties across an extensive geographic range, but also to the actual presence of women from different backgrounds within Promontory society itself. A deeper consideration of oral traditions and historical intertribal gaming accounts reveals that debt slavery arising from high-stakes gambling contests could itself be a mechanism by which individuals moved into this and other societies.

In Chapter 7, I return once again to the Promontory Problem and the ceramics that are so central to it. With the gaming assemblage from Cave 1 suggesting the presence of women from diverse backgrounds, ceramics, normally an aspect of women's craft production (Rautman 1997:117; Roscoe 1991:203; Senior 2000:72), merit reconsideration, especially in comparison to other assemblages from the Late Prehistoric period. One objective of this reappraisal is to identify a possible parent tradition (or traditions) for the Promontory ceramic tradition, with Chournos Springs once again standing out as a possible candidate. Seeking to distinguish assemblages left by groups that engaged in limited intersocietal contact (stylistic divergence, limited trade), more established contact where material and ideas travelled freely (type-level mixing, copying with errors), and close contact that featured the sociodemographic movement of experts themselves (phenotype-level mixing, local manufacture of non-local types), the Promontory ceramic record not only supports that ethnogenetic change took place, but that such changes were not unidirectional. However, on a local level, Chournos Springs appears to show more influence from pottery makers at the Promontory Caves than vice versa. At the caves, while some imitative learning and perhaps even experimentation with ceramic production are evident, the earliest specimens demonstrate the existence of an already refined ceramic tradition prior to arrival at Promontory Point. They are a departure from precursor Great Salt Lake Fremont ceramics at Chournos Springs. The ubiquitous calcite-tempered ceramics at Cave 1 are instead often indistinguishable from those of the Uinta

Fremont of the northern Colorado Plateau, while a highly micaceous type known as Knolls Gray, best known from sites south and west of the Great Salt Lake (Rudy 1953), is also present, drawing into focus additional loci of contact and social recruitment. Significantly, this review finds that the ceramics at Cave 1 are different from those of the eponymous Promontory Phase, especially as represented by later-dating sites to the south in Utah Valley. While the relationship between the caves and later is not challenged, these data support the subdivision of the Promontory Phase into early and late sub-phases (see also Janetski, in prep., and Johansson 2013). Late Promontory ceramics were manufactured differently enough to be considered by many analysts as a distinct ceramic ware, but Early Promontory ceramics show continuity principally from the Uinta Fremont tradition.

In summary, contact not only occurred and was ethnogenetic in character, but on a far wider geographic scale than initially anticipated. Women are key in this discussion, both in the evidence for individuals bringing diverse gambling traditions into a single community and in the local manufacture of ceramic styles informed by different traditions. While additional elements of the Promontory archaeological assemblages may offer insight into information exchange and sociodemographic movement among men in Promontory and Fremont groups, population genetics also emphasize a skew towards the movement of non-Ndee women into Proto-Southern Dene societies as they entered the Southwest, and possibly during the migration southward (Lorenz and Smith 1996; Malhi 2012; Malhi et al. 2003). In questioning why women may have been particularly sought, an analogue can be found in the interactions between Plains bison hunters and Puebloan horticulturalists of the Protohistoric period: communal bison hunting carried with it particularly strong demands for their labour (Baugh 1982, 1986; Habicht-Mauche 1988, 1991, 2005, 2008, 2012; Spielmann 1982, 1991; Vehik 2002). The economic realities of communal bison hunting acted as a powerful motivation for group formation processes that promoted alliance-making, intermarriage, and other forms of recruitment and ultimately led to the formation of large polyethnic groups.

An early stage of interaction between Proto-Southern Dene and Proto-Kiowa-Tanoan Uinta Fremont groups is a critical piece of the Promontory puzzle, revealing the opportunities for access to both territory and knowledge that these peoples would have offered each other. It is possible to infer not only the social mechanisms Proto-Southern Dene peoples used as they migrated into the intermountain west, and that Proto-Kiowan peoples used to make the transition from post-horticulturalist, broad-spectrum foragers to communal Plains bison hunters, but the routes that they followed. Highlighted in this discussion are archaeological manifestations of both groups as their histories became entwined, persisting in the vicinity of the Great Salt Lake and Utah Valley after the abandonment of the Promontory Caves, extending north to the Snake River Plain in the 14th and 15th centuries, and on the Plains in the many expressions of the Dismal River tradition.

This work leans heavily on the hypotheses of migration to and emigration from the Great Basin in the late and post-Fremont periods. I am far from the first to reach these conclusions (cf. Aikens 1966; J. Gunnerson 1956, 1960; Jennings 1978; Steward 1937*a*), but prosocial intergroup contact and ensuing processes of ethnogenetic change are new contributions to this discussion, offering mechanisms and motivations for the social access of Promontory peoples into the northeastern Great Basin in the 13th century AD, and for Great Salt Lake Fremont peoples out of it shortly thereafter. Alliances between communities with highly divergent subsistence bases, ethnic identities, and languages are not without precedent among modern Native American groups; early Diné coalescence and the Kiowa–Kiowa Apache dichotomy offer not only a model for the type of polyethnic coalition-forming processes envisioned here but may actually represent outcomes of the prehistoric events at Promontory Point and elsewhere around the Fremont world.

Chapter 1: Physiographic Setting

The Great Salt Lake and environs are situated within the northeastern portion of the Great Basin—both the endorheic geographic region first identified by John C. Frémont (1845) and the culture area defined by Alfred Kroeber (1939). The geographic and cultural areas do not perfectly overlap. The Great Basin in the hydrographic sense—that is, the vast area in the modern-day western United States from which watercourses make no egress to any ocean—only applies to the series of generally north-south oriented mountain ranges and valleys extending from the Great Salt Lake and its tributaries in the east to the Sierra Nevadas in the west, encompassing western Utah, eastern California, small portions of Idaho, Wyoming, and Oregon, and virtually all but southernmost Nevada. Based largely on the historic distribution of speakers of Numic languages[1] and on a commonality of predominantly sagebrush-juniper plant cover, Kroeber also included adjacent regions as part of the Great Basin culture area: the Snake River, which drains into the Columbia; the northern Colorado Plateau, including the upper Colorado and Green River drainages; and the Wind River country, which drains into the Missouri on the eastern slopes of the Rocky Mountains (Kroeber 1939:49–55).

Kroeber's definition, which is entrenched in much of the anthropological and archaeological literature, greatly expands the scope of the Great Basin to include all of Utah and Nevada, the western halves of Colorado and Wyoming, the southern half of Idaho, much of the Oregon interior, and parts of northern Arizona and New Mexico (for a comprehensive review, see the Smithsonian Institution's *Handbook of North American Indians, vol. 11*: *Great Basin*, d'Azevedo 1986). Kroeber acknowledged that this broader definition, though convenient, could also be problematic, for instance given much of the Colorado River drainage's prehistoric association with Ancestral Puebloan rather than Numic peoples, and by extension stronger ties with the neighbouring Southwest culture area (Kroeber 1939:49). More recently, some archaeologists have restricted their use of the term Great Basin to the geographic region rather than the culture area (e.g., G. Jones and Beck 2012). For the sake of accuracy, and out of a desire not to presuppose cultural heterogeneity across disparate regions in prehistory, I follow the geographic definition in this work, making separate reference to adjacent regions (i.e. Snake River Plain, Colorado Plateau, etc.) when needed.

Topography and Hydrography

The central geographic focus of this work—the Promontory Peninsula, or Promontory Point[2]—is the southern portion of the Promontory Mountains that extends some 20 km into the north side of the Great Salt Lake (Figures 1.1, 1.2). The mountains divide the northern half of the lake into two great bays: the larger Gunnison Bay to the west and Bear River Bay to the east. The latter is named for the Bear River, the lake's largest tributary, which runs 790 km in a long northerly arc via Wyoming and Idaho from the slopes of the Uinta Mountains in northeast Utah (USGS 1979*a*), terminating in an extensive shallow wetland at the northeast margin of the Great Salt Lake. Adjoining Bear River Bay is the smaller Weber Bay to the east, fed by the Weber River and bearing its own alluvial plains and wetlands that at times of low lake level merge with the Bear River's. A third major tributary and accompanying wetlands are in the Salt Lake Valley to the southeast, where the Jordan River flows from Utah Lake, which is in turn fed primarily by the extensive Provo River drainage system and a number of smaller streams. Collectively, these

Figure 1.1. Promontory Point, Utah. Base map and plotted site coordinates courtesy Kisha Supernant.

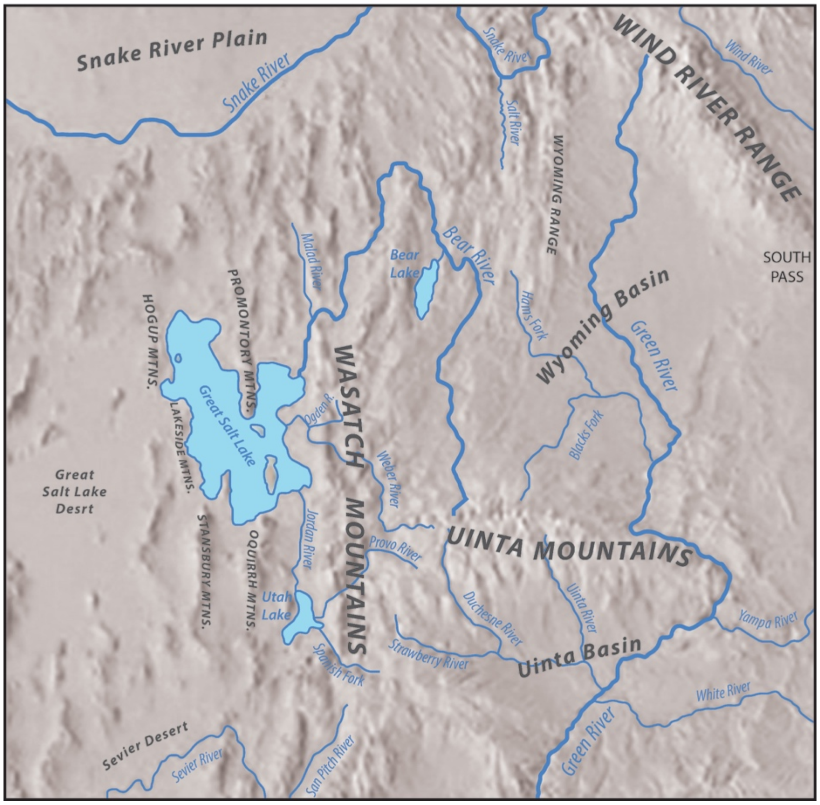

Figure 1.2. Principal physiographic features discussed in text. Note that while the entire area depicted falls within Kroeber's (1939) Great Basin culture area, the northeastern limits of the endorheic Great Basin are reached with the Bear, Weber, and Provo drainages. To the north, the Snake River Plain is part of the Columbia Plateau. To the east, the Green River drainage forms the northern Colorado Plateau, with the Wyoming Basin bridging the Continental Divide (via South Pass) to the Plains beyond.

drainages and wetlands, including those on both the highly saline Great Salt Lake and freshwater Utah Lake, have been an important locus of human habitation both in the recent past and in the preceding millennia. The Bear, Weber, and Provo Rivers all flow out of the Wasatch Mountains, a north–south running range that dominates the eastern shoreline of the Great Salt Lake and Utah Lake. The well-watered slopes and lowlands along the lakes' eastern shores, now largely developed over by urban sprawl, are referred to as the Wasatch Front.

The closed-basin Great Salt Lake is effectively ringed with a series of north-trending mountain ranges: the Promontory to the north and Wasatch to the east, as well as the Oquirrh and Stansbury Mountains to the south and the Lakeside and Hogup Mountains to the west. Promontory Point is highly visible from most vantages around the lakeshore except the southeast, the vicinity of Salt Lake City, where the view is obstructed by the mountainous Antelope Island. From the southernmost tip of the point, the Promontory Mountains extend 56 km nearly due north, beyond which a series of other adjacent block fault ranges extends generally northward on the west side of the Bear River Valley to the Snake River Plain in Idaho.

Caves in the Promontory area have long been recognized as important loci for human activity. Julian Steward (1937*a*:3–5) designated a total of 12 Promontory Caves, only six of them (Caves 1–6) on Promontory Point proper. The other six are on Little Mountain, an isolated landform at the margin of the Bear River wetlands. While caves are common throughout the Great Basin, Steward felt the folded limestone of the Promontory Range was especially susceptible to cave formation by wave action during different stages of Pleistocene Lake Bonneville, of which the Great Salt Lake is a greatly diminished remnant. He reported seeing or hearing of many more than the dozen caves he visited personally. These included several he observed during aerial reconnaissance in 1931, as well as those visited by a Mr. Fridal of Tremonton, a collector who donated a number of the artifacts from Cave 1 that are now in Steward's NHMU collections. Steward also reported a number of caves described by two Elders of the Northwestern Band of the Shoshone (or Promontory band, as Steward called it)—Old Diamond[3] and his sister Posiats—the former having been born in a cave on the west side of Promontory Point a short distance north of Cave 1 (Steward 1937*a*:5–7, 84). Additional high-elevation caves were observed by members of the Promontory research team during the 2011–2014 expeditions, though they largely remain unsurveyed.

Figure 1.3. View northwest from Chournos Springs (42BO1915) across Indian Cove to north spur of Promontory Mountains, April 2011. Promontory Caves 1 and 2 are in the cliffs to the left of and below the grassy saddle in the centre of the photograph; Cave 3 is in the higher cliffs to the right, and Cave 4 is on a rocky outcrop near lake level below Cave 3.

The caves that have been visited by the Promontory research team (Caves 1–4) are all on the west side of Promontory Point on a single spur of the main range, facing south over a small bay called Indian Cove (USGS 1991*a*; Figure 1.3). The caves occur at varying elevations, mostly corresponding with shorelines of Lake Bonneville during its complicated history of transgression and regression. Around 14,500 BP, the lake catastrophically drained from its maximal level of 1550 m above sea level to the 1445-m Provo level, spilling out through a high-altitude canyon that adjoins what are now the Bear River and Snake River drainages (Malde 1968; W. Scott et al. 1983; Jarrett and Malde 1987; O’Connor 1993). The lake has since regressed to an approximate level of

1280 m that has varied only slightly for much of the Holocene (Oviatt et al. 1992). Steward (1937*a*:8) measured the caves' elevations relative to an "abnormally low" shoreline in 1931 that can serve as a rough proxy for current lake levels: the Great Salt Lake reached a historically low level of 1277.5 m in October 2016 (Carlowicz and Stevens 2016). Cave 1, the largest of the Promontory Caves, is about 80 m above that lake level, just below the approximately 20,000-year-old Stansbury shoreline (Oviatt et al. 1992; Steward 1937*a*:8). Cave 2, at about 20 m above lake level (Steward 1937*a*:90), is slightly above the Younger Dryas-era Gilbert shoreline, dated to between 12,900 and 11,200 BP (Oviatt et al. 2005). Cave 3 is far higher, just above the Provo shoreline, while Cave 4, a small rock shelter, is situated very near the present shoreline (Steward 1937*a*:4).

Climate Zones and Variability

Though a net imbalance between inflow from tributary streams and evaporation is responsible for the millennia-long decline in lake levels from the Provo shoreline to that of the present day and the ensuing alkalinization of the lake (Oviatt et al. 1992), much of the Great Salt Lake area is not exceptionally arid. The variety of climatic zones on different sides of the Great Salt Lake is of some significance when considering resource availability in the different areas and the differing specializations of human populations who may prehistorically have converged on the lake. The eastern shore and the Utah Valley to the south can be characterized as having a hot-summer humid continental climate (Köppen climate classification Dfa), while Promontory Point and some other ranges and valleys west of the Wasatch Front are more properly classed as semi-arid steppe with cold winters and hot summers (Köppen climate classification BSk). The driest areas are to the southwest, where the Great Salt Lake Desert and Bonneville Salt Flats extend beyond the Hogup and Lakeside Mountains (Köppen climate classification BWk, cold desert; Peel et al. 2007).

Rainfall is highest in the spring. Oscillations from abundant rainfall to sometimes-severe drought are normal for the area, however, with tree ring reconstructed precipitation records showing a strong periodicity between wet and dry cycles extending back to AD 1429. Cycles were multidecadal (~30- to 60-year cycles) prior to AD 1700 and quasi-decadal (~10- to 15-year cycles) from AD 1700 to present (DeRose et al. 2014). Wet spells correspond with subsequent rises in lake level, offset by approximately three years, including heavy rainfall in the early 1980s that led to record high water levels on the Great Salt Lake in 1987 (Karl and Young 1986; S. Wang et al. 2010; S. Wang et al. 2012). Periods of stability followed by rapid shifts between high and low water levels would have been of no small significance to prehistoric peoples. Joan Coltrain and Steven Leavitt (2002) have speculated that high water would have greatly restricted the extent of wetlands along the Great Salt Lake shore, while low water would have greatly expanded them. When water levels were high, maize horticulture might have been preferred, practiced on rich alluvial soils above wetlands east and north of the lake from AD 400–1150 (Aikens 1966, 1967*a*; Coltrain and Leavitt 2002:464; Fawcett and Simms 1993; Fry and Dalley 1979; Shields and Dalley 1968; Simms et al. 1991). Periodically, the attractiveness of wetlands as a foraging environment would have increased, roughly coinciding with times of drought that caused maize returns to diminish or fail altogether. While a periodic shift from farming to foraging and back again within a single lifetime could have been a regular aspect of peoples' lives along the Great Salt Lake, a significant moisture anomaly across the Great Basin at AD 1150, preceded by several decades of low rainfall, may have triggered an enduring abandonment of maize horticulture at that time (Coltrain and Leavitt 2002:476–77; Graybill 1986; Leavitt 1994).

Vegetation, Wetlands, and Springs

In the vicinity of the caves, vegetation differs sharply between lower elevations and upper slopes. Clumps of greasewood (*Sarcobatus vermiculatus*), rabbitbrush (*Ericameria nauseosa*), and various grasses dot the flats along the lakeshore. The area is heavily grazed by sheep and cattle at present, and the patchy, often barren understory is dominated by invasive, grazing-tolerant plants (Vandy Bowyer, pers. comm., 2013). Utah juniper (*Juniperus osteosperma*, also referred to as *Juniperus utahensis*) is staggered along the upper slopes at elevations parallel to Caves 1 and 2, together with grassy patches on all but the steepest talus slopes and the sheer cliffs that mark the highest elevations. Box elder (*Acer negundo*) and netleaf hackberry (*Celtis reticulata*) can be found up more shaded, north facing slopes. Surface water is scarce, but the broad flats between the mountain spur at the north end of Indian Cove and the spur that frames its south end form a drainage basin for several east-trending valleys that run up to the main spine of the Promontory Range. Deep-cut arroyos cross these flats, and an alluvial fan extends across their southern extent. Surface flow may occur here during periods of heavy rainfall.

A series of freshwater springs is situated where the lip of the alluvial fan meets the Great Salt Lake shore (Figure 1.4). These wetlands, some 4 km southeast the caves, are unique in the immediate vicinity,[4] and the springs are almost certainly the same ones noted by Steward (1937*a*:10) as the nearest freshwater source,[5] excepting winter snowfall. Willows (*Salix* spp.) and cottonwoods (*Populus* spp.) grow at the mouth of the deep-cut arroyo that opens at their southern

Figure 1.4. View west-southwest across Gunnison Bay from Great Salt Lake beach ridge at Chournos Springs, April 2011. Channels of freshwater springs are visible snaking through the wetland in foreground, which extend out along the muddy lakebed when water levels are lower.

end, and a thriving if highly localized wetland is present around the springs and their runoff channels along the exposed flat, muddy lakebed. This wetland extends from the cobble-lined highwater mark of the present shoreline to within a few meters of the current water level, perhaps 100 m in breadth at present. The combination of fluctuating wetland and adjacent alluvial fan is of considerable interest from the perspective of cyclically adjusting forager/farmer adaptations suggested by Coltrain and Leavitt (2002).

CHAPTER 2: CULTURE-HISTORY OF THE GREAT SALT LAKE AREA

In this chapter, I review the cultural setting of the Promontory research project with an aim towards situating the Promontory Caves' inhabitants within a sometimes-contentious framework of named archaeological cultures and traditions. This framework is not fixed, and not all questions about the Promontory phenomenon, or even about the cultural periods it to which it relates, are resolved. Discussion focuses on a period of cultural transition following the decline of maize horticulturalism in the eastern Great Basin—that is, the end of the Formative period—reviewing the literature on the farming and foraging peoples known as the Fremont (and in particular the Fremont around the Great Salt Lake), the narrative of their succession by peoples who may have been affiliated with the occupants of the Promontory Caves, and the spread of the Numic peoples who occupied the region at the time of European contact. Owing to a general scarcity of sites and data, the post-Formative era, collectively referred to as the Late Prehistoric period, is one of the least-understood periods in Great Basin prehistory.

Newfound clarity has been provided by the recent high-resolution dating of artifacts from the Promontory Caves (Ives et al. 2014; Yanicki and Ives 2017), placing their peak occupation over a period of 25–42 years between AD 1247 and 1291, squarely in the midst of the Fremont–Late Prehistoric transition. This is a time when people were still producing objects stylistically associated with, and therefore learned from, that long-established Fremont tradition, although maize horticulture had been in dramatic decline in the nearby Great Salt Lake marshes since about AD 1150 (Coltrain and Leavitt 2002). The dates are decades earlier than those otherwise known for the Promontory Phase, named after the caves but principally observed elsewhere in the northeast

Great Basin. The caves themselves are meanwhile situated in a zone at or beyond the outermost margins of Fremont horticulture, and where broad-spectrum foraging was practiced for millennia, which constitutes a grey area in dating the Numic expansion. As such, the cultural context of the Promontory research project cannot be understood without addressing the intersection of three great problems in Great Basin archaeology: the end of the Fremont horticultural way of life, the cultural affiliation of the Promontory people, and the spread of the Numa.

A further aim of this chapter is thus to outline some outstanding questions where additional research can refine knowledge of this transition period: the significance of the area as a frontier zone and the prospects for different types of cultural interaction that could entail, the demonstration of contemporaneity of culturally distinct populations, and the nature of the contact that took place and its significance for archaeologically detectable processes of culture change over time. The well-attested migratory context of the inhabitation of the Promontory Caves and its identification as a population with ancestral Southern Dene ties demonstrate influences from a broader geographic scope than can be thoroughly addressed in this review. Focus is given here to prehistoric cultural identities in the northeast Great Basin, while the ethnogenetic significance of events here, including the role of cultural interaction in the emergence of both Proto-Southern Dene and Proto-Kiowa, is explored in the following chapters.

Several themes characterize the prehistory of the northeastern Great Basin. One of the most prevailing in the archaeological literature has been continuity, perhaps from the earliest period of human occupation and continuing through to the modern day, by peoples specialized in utilizing the scarce and varied resources the region has to offer. Another theme is of environmental degradation, with periodic cycles of drought forcing people to abandon large swathes of the Great Basin or at least to rethink how best to survive. Yet another theme is of repeated cycles of migration, with newly arrived peoples each time replacing the old. While the popularity of each theme has waxed and waned over the last several decades, it is doubtful that any one approach to understanding the cultural history of the Great Basin is correct to the exclusion of all others. Something more nuanced involving a combination of these and other themes may be closer to reflecting the actual course of events.

The literature on the archaeology of the Great Salt Lake area is vast, and a comprehensive regional survey incorporating all published reports and more recent cultural resource management projects is beyond the scope of the present study. The aim of this work is to outline themes in the development of archaeological thought on the region's prehistory and to identify key sites, cultural units, and stylistic traditions essential for the interpretation of materials recovered on Promontory Point. Because excavations undertaken in the course of this study, and of the larger Promontory project, resulted in the recovery of artifacts from every period in Great Basin prehistory, an overview is presented here of the full human history of the region up to the time of Euro-American colonization.

This review aims to draw into sharpest focus the critical period in the 13th century AD when peak occupation of the Promontory Caves occurred. Three series of events have been of particular interest to many scholars of Great Basin prehistory during this narrowly focused window of time: the decline of the Fremont, the expansion of Numic peoples, and the question of how the sudden albeit brief efflorescence of the Promontory Culture fits within this framework. Increased resolution of both the chronology of the Promontory Caves' inhabitation and their position within the wider scope of Southern Dene prehistory makes evident that in addition to processes of continuity, abandonment, and replacement, the additional theme of intercultural contact is key to understanding the onset of the Late Prehistoric period in the northern Great Basin.

The use of unitary cultural labels for prehistoric peoples and time periods in the following sections rests on an uneasy assumption that what these terms define is clear, when their usage can at times be anything but. While I strive for clarity of terminology here, questions of how terms such as Fremont and Promontory are employed by archaeologists and what the related concepts of ethnicity and identity mean to their bearers merits further consideration. Thus while the archaeological identification of cultural units is presented here, theoretical questions of how these relate to emic concepts of identity, how ethnic identities are formed and reinforced, and how changes to them can be archaeologically detected are discussed in Chapter 4.

The Ethnographic Record and the Numa

At the time of European contact in the late 18th and early 19th centuries,[6] the Great Basin and adjacent regions were home to Numic-speaking peoples ancestrally affiliated with several modern-day tribal organizations. Numic, and the related ancestral term Numa, are derived from cognates of the word for "person" or "people" in a cluster of languages in the Uto-Aztecan language family (the term "Numic peoples," like "Dene peoples," would therefore be redundant). Three great divisions to the Numic languages are recognized: Western Numic in the northwest Great Basin and southeast Columbia Plateau, Central Numic across the central and northeast Great Basin and into the upper Snake River Plain and Wind River country, and Southern Numic across the southern Great Basin and northern Colorado Plateau (Golla 2007:74–76; Lamb 1958). In spite of these bonds of language, superordinate tribal designations employed today are to some degree modern contrivances for people that commonly lived in broadly dispersed and only loosely affiliated groups.[7] Shared ancestry and ancient connections are nevertheless recognized in the collective use of terms such as Neme or Newe among Central Numic speakers and Nuche among Southern Numic groups to refer to 'the People' (Defa 2003:75; Duncan 2003:167; Parry 2003:26). Other endonyms usually employed distinguished between bands, frequently making reference to geographic landmarks where the groups lived or, just as commonly, the principal food resource exploited by an area's residents—thus, "sheep eaters," "ricegrass eaters," etc. (Murphy and Murphy 1986; D. Thomas et al. 1986).

With the exception of the relatively fertile streams and valleys on the east side of the Great Salt Lake and a few other locales, large portions of the region could support population densities of no more than one person per 15–20 square miles (24–32 km^2; Steward 1937*b*:628). Unpredictable and oftentimes harsh environmental conditions contributed to a highly decentralized form of social organization: many Numic groups resided in bands little larger than nuclear families with a few additional relatives (Steward 1955*a*:101–21). Scarce or unreliable food resources made it difficult for larger groups to reside in one location for any period of time—again, with the Wasatch Front being an exception—and only for brief periods in the year would people gather in larger numbers (Steward 1955*a*:105).

Pre-contact divisions and distribution

In the vicinity of the Great Salt Lake, several Central Numic bands speaking the northern dialect of Shoshone and today encapsulated within the Northwestern Band of the Shoshone ranged from the Bear River wetlands to the Snake River valley and up the Bear River and its tributaries to the Bear Lake area. These included the Painkwitikka ('fish eaters') of Cache Valley and the Kammedeka ('jackrabbit eaters') and Hukundüka ('porcupine grass seed eaters') between the Great Salt Lake and Snake River (Murphy and Murphy 1986; D. Thomas et al. 1986). At the time of contact, these groups were sometimes also referred to as So-so-goi, a Shoshone endonym from the Protohistoric era meaning "those who travel on foot" (Parry 2003:26).

The Kusiutta (Goshute, lit. 'dry earth people'), speakers of the western dialect of Shoshone, resided in the drier desert ranges and valleys to the south and west of the Great Salt Lake (Chamberlin 1912:2; Defa 2003:77; D. Thomas et al. 1986). To the southeast resided several bands of Southern Numic-speaking Utes, or "Utah," around the eponymous Utah Lake and in the surrounding mountain valleys. Among them, the Pawanutch ('lake people') or Tumpanawach ('fish eaters') lived at a number of locales including a semi-permanent village at the mouth of the Timpanogos (now Provo) River, a focal point for annual gatherings, feasting, and gambling each spring (Bancroft 1882:464; Bean 1919:21; Duncan 2003:174; Farmer 2008:25–27, 64, 91; Irish 1865:145; Janetski 1991).

Situated in the territory between the Shoshones and Utes on the east side of the Great Salt Lake, at the feet of the Wasatch Mountains in the Salt Lake, Ogden, and Weber River valleys, were bands comprised of intermarried speakers of both Ute and Shoshone languages. These groups were collectively referred to by American settlers as the Cumumbas or Cumumpahs, and later the Weber Utes (Bancroft 1882:469; Farmer 2008:62; Irish 1865:144–145; R. Metcalf 2002:133; G. Hunt 1876:460; Tourtelotte 1870:230). Intergroup hostilities were common, but so too were alliances among related kin groups, and membership between them could be quite fluid (Murphy and Murphy 1986; D. Thomas et al. 1986).

As the Neme endonym So-so-goi attests, in the Protohistoric period, before direct European contact but after the advances of European influence had begun to be felt, ownership of horses created pronounced differences in the status and political power of Numic groups (Farmer 2008; Parry 2003). Rarer in the central and southern Great Basin and more common around the region's eastern and northern peripheries, equestrianism was rapidly taken up by such groups as the Eastern Utes and Northern Shoshone and was instrumental in the spread of one Shoshonean group, the Comanche, onto the Southern Plains. Other groups that had a stable resource base fixing them to one locale (as among the fish eaters around Utah Lake) or that could not support horses for lack of sufficient forage (as among the more westerly Neme and Nuche) either only partially committed to equestrianism or did not do so at all (Farmer 2008:31–32). Exemplifying the difference in power horses provided was the frequency with which equestrian groups took slaves from pedestrian ones, through coerced purchase when possible and through violence and kidnapping otherwise (Blackhawk 2006; Brooks 2002; Farmer 2008:30–32). What Jared Farmer (2008:32) has referred to as a "caste system" emerged, with possession of horses becoming "the basis of fixed ethnic identities" between groups that spoke the same language (Ute vs. Paiute, Northern and Eastern Shoshone vs. Goshute), in the process greatly diminishing the ability of individuals to cross social boundaries.

European contact and colonization

Judith Habicht-Mauche (2005, 2008, 2012) has argued that elsewhere during the Protohistoric period, along the Plains-Pueblo frontier, it was the uptake of a bison hunting economy that fomented increased interest in the taking of slaves—especially women and children—

for the value of their labour in processing high-value meat and hides. Among Numic groups, the same may also have been true, with equestrianism perhaps marking a shift to a bison-hunting economy. By the time Spanish traders from New Mexico began routinely visiting Utah Lake in early 1800s, the commodities offered in exchange for their horses were both pelts and slaves (Sánchez 1997:5–13); early Mormon settlers were also commonly offered slaves in exchange for horses (Brigham Young, testimony dated January 15, 1852, cited in S. Jones 2000:125; Farmer 2008:51, 85; Gottfredson 1919:15–18; Nebeker 1930). Though greatly exacerbated by demand from New Mexico (cf. Defa 2003:83–90), slavery may already have been established in the Great Basin as an indigenous practice prior to the arrival of the Spanish.

American colonization of the Great Salt Lake area beginning in 1847 brought additional upheaval to indigenous populations, including almost immediate outbreaks of introduced Old World diseases accompanied by rapidly depleted game stocks and reduced access to prime hunting, fishing, and foraging locales. Raids on settlers' cattle herds and other such acts were met with disproportionate violence, culminating in genocidal campaigns by Mormon militiamen against the Timpanogos and other Utes of Utah Valley in 1850 and by the U.S. Army against Bear Hunter's band of the Northwestern Shoshone on the Bear River in 1863 (Farmer 2008; B. Madsen 1985; Stoffle et al. 1995). Enslavement, assimilation, and forced relocation of survivors followed. By the mid-1870s, the Cumumbas and Timpanogos had been entirely removed to the Uinta Valley, while the Northwestern Shoshone were resettled to Fort Hall on the Snake River Plain and the Washakie Reservation, since abandoned, in the Malad Valley (Farmer 2008; R. Metcalf 2002).

The process of depopulating the eastern Great Salt Lake area of its indigenous inhabitants in the late 19th century fostered an illusion in later decades of a desert landscape that had always been sparsely populated or even empty (Farmer 2008:105). With the recent spread of large urban centers including Salt Lake City, Provo, and Ogden, it is probable that most evidence of contact-period indigenous habitation along the Wasatch Front has been obliterated along with a great many pre-contact sites (Janetski and Talbot 2014), greatly diminishing prospects for making direct historical connections between the ethnographic and archaeological records. The aspects of language, material culture, and population genetics discussed in the following sections make frequent reference to a recent arrival of the Numa and discontinuity with earlier inhabitants, but it should be noted that the archaeological record in this regard is conspicuously incomplete. The processes of social recruitment, identity change, and the disconnect between genes, material culture, and language explored later in this work apply as much to the Numa as to other peoples. Although much archaeological work in the Great Salt Lake area has emphasized the non-Numic character of Fremont and earlier assemblages, it remains unresolved whether individuals from archaeologically attested populations of the Great Salt Lake area intermarried into ancestral Northwestern Shoshone, Ute, and Kusiutta groups (Cabana et al. 2008). Any study which fails to acknowledge the possibility that some ancestors of modern-day Numic peoples were always present throughout much of the central and northern Great Basin stands to further disenfranchise them from their own heritage and to perpetuate historic patterns of erasure.

Early Great Basin Prehistory

The Paleoarchaic

As in other parts of interior North America, people began populating the Great Basin late in the Pleistocene epoch, a period referred to elsewhere as the Paleoindian and in this area as the

Paleoarchaic (Beck and Jones 1997; Willig 1989). The onset of human occupation probably dates to the moist Younger Dryas period, shortly before 10,800 BP, long after the region's large pluvial lakes had drained but at a time of substantial wetland and lake level transgression (G. Jones et al. 2003). While the archaeological record of this era is often typified by a reliance on now-extinct megafauna and other large game, Paleoarchaic peoples of the Great Basin had a wetlands focus and were reliant on a broad-spectrum array of food resources that also included lagomorphs (rabbits, jackrabbits, etc.), birds, rodents, lizards, fish, and molluscs (Beck and Jones 1997). Paleoarchaic foragers were exceptionally mobile, utilizing lithic raw materials from sources up to 450 km apart (G. Jones et al. 2003).

The Desert Archaic

Only as the warmer and drier conditions of the Holocene set in did people begin to exhibit a greater reliance on artiodactyls—hoofed mammals such as bighorn sheep, antelope, and bison—as well as an increasing utilization of seeds (Beck and Jones 1997; Elston 1982; Grayson 1993, 2011; Hockett 2007; R. Kelly 1997; Pinson 2007). Shifts in lithic technology accompanied this gradual transition in subsistence during the early Holocene, ca. 8,000–9,000 BP, to a period referred to as the Desert Archaic (or, formerly, the Desert Culture; Jennings 1953, 1957; Jennings and Norbeck 1955). The exact timing of this transition is uncertain, and appears to have occurred later in the northern and western Great Basin than in the east (Aikens and Madsen 1986; Cressman 1986; Elston 1986; Jennings 1957, 1968, 1986; G. Jones and Beck 2014; Simms 2008).

During the Desert Archaic period, people began organizing themselves into less mobile, more socially complex, and regionally specialized groups, with intensification and differentiation of local foraging patterns reflecting the variable abundance of food resources on the landscape, although some aspects of these processes were likely underway even in the Paleoarchaic (Bousman and Vierra 2012; Graf and Schmitt 2007; G. Jones and Beck 2012, 2014). Donald Grayson (1993, 1994) has cautioned, however, that the archaeological record of the very warm, dry mid-Holocene (ca. 7,500–4,500 BP) is poorly known. Sites from this era are only rarely detected, and population densities would have been dramatically lower than in earlier or later periods; people may even have abandoned large portions of the Great Basin for prolonged periods of time, only to return from the region's peripheries once conditions improved (Antevs 1948; Baumhoff and Heizer 1965; Cressman 1986; cf. O'Connell 1975). It may only be some time after about 5,000 BP, when cooler, moister conditions comparable to the present day took hold, that the patterns of intensive occupation and regional diversification for which the Desert Archaic is best known truly began to set in (Grayson 1993, 1994:23).

The Formative Period: Emergence and Retreat of the Fremont

Deriving from developments throughout the Southwest, some groups of people in the eastern Great Basin and northern Colorado Plateau began to adopt maize, bean, and squash horticulture as early as 2,000 BP, first as a supplement to the dietary breadth offered by wild foods, then with increasing reliance and accompanying sedentism and settlement growth by around 1,000 BP (Janetski and Talbot 2014). The horticulturalists north and west of the Colorado River were initially referred to as the "Fremont Culture," named after the Fremont River in southern Utah where it was first observed (Morss 1931).[8] Other significant technological innovations that first appeared around this time included ceramics and the bow and arrow, but these did not spread in concert with horticulture. External cultural influences thus appear not to have diffused from a single source, nor does a single population of migrant farmers seem likely to have been responsible for all the changes in the material record of this era. Peoples identified by archaeologists as Fremont can more properly be seen as a cluster of regionally and temporally differentiated groups including both resident and migrant peoples sharing common technological and ideological practices, but not necessarily involving an exclusive reliance on maize horticulture nor sharing a common language or ethnic identity (Berry 1972; Berry and Berry 2003; Geib 1996:53–77; Janetski 1993; Janetski and Talbot 2014; D. Madsen and Simms 1998:260; Spangler 1995:426–450, 2002; Talbot and Richens 1996:196–97). David Madsen and Steven Simms (1998) have noted that this amount of variability can better be described as a temporal and spatial *complex* rather than a single discrete culture, and thus the term Fremont Complex may better connote a number of groups sharing common material culture traits but uncertain ethnic affiliations, both in relation to each other and to descendant populations.

The suite of cultural attributes commonly associated with Fremont-affiliated occupations is treated in detail in reviews by Aikens and Madsen (1986), Janetski (1994), Madsen and Simms (1998), and Dean (2001), among many others. Briefly, Fremont peoples made distinctive surface and pit house architecture constructed with stone slab walls on the Colorado Plateau and coursed adobe (progressive hand-shaped layers of mud plaster) or wattle-and-daub (mud plastered over a wood and grass frame, also referred to as jacal) in much of the eastern Great Basin. More ephemeral, wickiup-like structures typical of the earlier Archaic period also continued to be made, especially in areas where farming was not possible—for instance, high elevations and the arid deserts to the west. Craftspeople, probably women, made ceramic vessels that regionally varied in terms of construction material and surface decoration, but conformed to a range of round-bottomed forms including single-handled pitchers, open-mouthed jars with slightly restricted necks, bowls, and miniature vessels. Fremont women also made close-coiled basketry, usually flat parching trays or bowls, with single-rod or half-rod-and-bundle stacked foundations, as well as twined mats and bags, pecked stone manos (often two-handed), metates with deeply shaped troughs for grinding corn and wild seeds, and well as deer- or mountain sheep-hide moccasins with a diagonal seam across the top of the foot and dewclaws positioned as "hobnails" at the heel. Distinctive iconography is perhaps the greatest hallmark of the Fremont, expressed in rock art panels, stone and bone ornaments, and most recognizably, in wedge-shaped anthropomorphic figurines made from unfired clay. Projectile points from Fremont occupations vary regionally, with side-notched, basally notched, and triangular forms often being indistinguishable from neighbouring regions; many styles were replaced by tri-notched "Desert-Series" types in the post-Fremont era. People buried their dead in flexed or unflexed interments, usually without extensive grave goods, in the floors of residential structures or in nearby refuse heaps. Finally, some reliance on and access to corn, even in locales where foraging was the primary subsistence activity, is evident at Fremont sites. The end of maize horticulture arrived at different times at different locales, up until the mid-12th century AD in the Great Salt Lake area (Coltrain and Leavitt 2002) but persisting until the early 1300s at Clear Creek, in south-central Utah (Janetski et al. 2000).

Neither horticulture nor the other manifestations of the Fremont Complex appear across the full extent of the Great Basin, and there is little or no evidence for the Fremont in much of the central and western areas. Madsen and Simms (1998:279) have nevertheless argued that the Archaic period ended when the agricultural transition began: because the impact of agriculture would have extended beyond the societies themselves practicing it, the way of life for "foragers at and perhaps beyond the fringe of the agricultural spread… no longer existed." The appearance of horticulture is regarded in many culture-historical models as the distinguishing feature of the onset of a region's Formative period, and the term is commonly used in Great Basin literature (e.g., Coltrain and Stafford 1999; Forsyth 1986; Janetski 1993; Talbot and Wilde 1989). Some authors have challenged or rejected the Formative label on the basis of its implying evolutionary stages (i.e., from hunter-gatherer to farmer) when in fact hunting and gathering remained common for as long as horticulture was practiced, and people consistently appear to have selected among alternative forms of subsistence rather than "progressing" from one to another (D. Madsen 1982; D. Madsen and Simms 1998; Upham 1994:119–20). The complaint against unilinear progression is valid, but the term "Formative" is less problematic than the alternative "Fremont period," which repurposes a label given to a single archaeological culture (or loosely bounded complex of cultures, however difficult to define) to a period of time. Using such nomenclature, all peoples in the Great Basin and beyond, whether farmers or foragers or something else entirely, become Fremont peoples. The same glossing over of cultural variability does not exist in the Southwest, where multiple Formative period cultures (i.e., Hohokam, Mogollon, Ancestral Puebloan) are readily recognized.

With respect to the behaviouralist focus which came in vogue in Fremont archaeology in the 1980s and 1990s, the very usefulness of culture as an organizing concept was called into question (D. Madsen 1989; D. Madsen and Simms 1989:23–24; Simms 1990:1), but spurred in part by the requirements of 1990's Native American Graves and Repatriation Act and related legislation, and by the practical and ethical concerns of Indigenous archaeology in general, the accurate identification and respectful analysis of ancestral groups are significant research foci in their own right. While the diversity of Fremont behaviour must be acknowledged, abandoning the culture concept precludes the ability to identify different groups of people during this era, to recognize new or emergent forms, or to associate material patterns with self-held concepts of identity that remain salient among descendant peoples today. The term Fremont is thus used in this work to refer to the makers of the body of recognizable material culture on the Great Basin/Colorado Plateau described aboce, and who themselves may have been both farmers and foragers. The Formative period refers to a time period when behaviours were genuinely formative: if horticulture was not universally adopted, it was at least now present. Many groups were engaged in the trial-and-error processes of making farming work in environments where it had not previously been practiced, and new social dynamics were at play involving the choice to farm or to forage, and between groups of people who committed to the more sedentary requirements farming entailed and those who did not. The problem of recognizing what is and is not Fremont is of some significance when considering migrations in the terminal or post-Formative period.

The Formative period spans at least 1,200 years, and several localized differences in Fremont material culture have been identified in different areas of Utah, with gradational differences between them and with different local developmental sequences. Notable variants, often drawing on differences in ceramic production, have been noted in the San Rafael Swell and Uinta Basin of the eastern Colorado Plateau, and in the Parowan Valley, Sevier Valley, and Great Salt Lake areas of the Great Basin, as well as the intermediate uplands of the Wasatch Plateau (Ambler 1966; D. Madsen 1979*a*; D. Madsen and Lindsay 1977; Marwitt 1970; Steward 1933; Wormington 1955). The validity of these variants as Fremont "subcultures" has been challenged, as other styles of craft and tool production do not necessarily follow the same geographic distributions (Berry 1972; Berry and Berry 2003; D. Madsen 1970; D. Madsen and Simms 1998:272–274; R. Madsen 1977; Watkins 2009). Regional differences in architecture, settlement and subsistence patterns, and iconographic media have also been noted (Baker and Billat 1999; Castleton and Madsen 1981; Jennings 1978; Lohse 1980; D. Madsen 1979*a*; Talbot 2000). Though difficult to define according to precise boundaries, band-level social organization may have existed on the scale of individual valleys or clusters of neighbouring valleys (Janetski and Talbot 2014:122). Many authors have emphasized the persistence of foraging activity throughout the Formative period, which could reflect enduring patterns of symbiosis between farming and foraging groups. At some locales, it could also represent wholesale switching at the community level between farming and foraging activity as wetlands increased or decreased in size in response to multi-decadal cycles of rainfall and drought (Berry 1972:169; Coltrain and Leavitt 2002; D. Madsen and Simms 1998).

In the Great Salt Lake area, the reasons for Fremont decline are well understood on ecological terms. "At A.D. 1150, the onset of drought or a shift in the seasonality of moisture either eliminated farming altogether or adversely affected crop yields disrupting social networks to the extent that farming was abandoned" (Coltrain and Leavitt 2002:479); numerous authors have identified a shift at Fremont sites to a dependence on wild food after this time (Allison et al. 2000; Cannon and Creer 2011; Coltrain and Stafford 1999; Janetski 1994; Janetski and Smith 2007; Simms and Heath 1990). Reduced to a more marginal subsistence, further drought in the late 13th century is associated with the end of Fremont material culture (Benson et al. 2007). By about 700 BP (approximately AD 1250), and perhaps a century or so later in some parts of the south-central

Great Basin, people ceased to produce the distinctive iconography, crafts, and settlement patterns of the Fremont Complex (Coltrain and Leavitt 2002; Janetski and Talbot 2014).

Madsen and Simms (1998:324) have argued that with the end of maize horticulture, "there was no more Fremont complex," but:

> People continued to live in areas where farming had been common, although there is also evidence for subcontinental-scale migrations at this time.… [T]his almost certainly did not lead to a "disappearance" of the people who made up the Fremont complex when farming was around.… [T]hese processes simply adjusted population genetics, marriage patterns, trading relationships, and language distributions in the region.

It is the characterization of these post-Formative processes that are of particular interest to the present work.

Great Salt Lake Fremont

The Formative period peoples of the Great Salt Lake area—that is, the Great Salt Lake Fremont—are of central concern to the geographic focus of this study. Defining a typical site or assemblage of this regional variant is difficult, however: the term Great Salt Lake Fremont encompasses geographic and temporal variability perhaps greater than that seen in other parts of the Fremont world, making them a microcosm of the Fremont phenomenon as a whole.

Material culture

Like other peoples of the Formative period, the peoples living on the east and southeast margins of the Great Salt Lake and into the Utah Valley produced distinctive ceramics. Even the earliest examples of pottery from this area to make their way into museum collections (five specimens collected by Ferdinand V. Hayden of the U.S. Geological Survey from construction in downtown Salt Lake City in 1870; Smithsonian National Museum of Natural History cat. no. A9761–0)[9] fit the general template for a distinctive type: "They include a rim fragment with a round handle attached, and shards of a plain gray cooking pot, decorated around the neck with three parallel bands of thumb-nail impressions" (Judd 1926:15). This description is recognizable as Great Salt Lake Gray, one of the hallmarks of the Great Salt Lake Fremont. The type is formally described as a thin-walled, coiled and scraped grayware tempered with varying proportions of quartz, mica, and igneous rock and shaped into round-bottomed pitchers with single handles attached from the shoulder to the rim, and into globular ollas (wide-mouthed pots) with slightly restricted necks and flaring rims, as well as bowls and miniature vessels; infrequent decoration, usually restricted to the neck and shoulder areas of vessels, includes incised lines, circular punctates, coffee bean-shaped appliqués, and rows of thumbnail impressions (D. Madsen 1979*b*, 1986; R. Madsen 1977; Rudy 1953). Additional variability is ascribed to Great Salt Lake Gray, however, and in many cases, variants that do not closely match the type description have nevertheless been classified as such. These issues, and the necessity of distinguishing between subtypes of Great Salt Lake Fremont ceramics, are discussed below and in Chapter 7 of this study.

A number of projectile point types are associated with the Fremont era, including variants specific to southern and northern Utah (Holmer and Weder 1980). Throughout the Great Basin and adjacent Colorado Plateau, Rose Spring Corner-notched points are associated with the earliest Fremont sites; these are frequently accompanied by Eastgate Expanding-stem points along the northwestern Fremont periphery. These point types are similar to other small corner-notched variants across western North America and may better be thought of as a "post-Archaic horizon marker" rather than a cultural diagnostic (Reed et al. 2005:271). Both types were eventually replaced, between A.D. 800-950, by region-specific and distinctively Fremont variants; in the Great Salt Lake area, Uinta Side-notched and Bear River Side-notched points persisted until about A.D. 1200 and 1350, respectively, with the latter being particularly associated with Great Salt Lake Gray ceramics. Two other projectile point types—Elko series and Cottonwood Triangular—are of note for their possible association with Fremont sites. Elko series points, much larger than side- and corner-notched Fremont arrow points, have origins in the Archaic period (Holmer 1986). "Their presence at Fremont sites usually reflects their use as hafted knives. Elko points were probably both manufactured by the Fremont as well as scavenged from the refuse of Archaic occupations and reused" (Reed et al. 2005:271). Cottonwood Triangular points meanwhile make up 15% of all Fremont projectile points in the eastern Great Basin, either constituting a significant point type in their own right or indicating that unnotched arrow point preforms are frequently misidentified (Reed et al. 2005:271-273).

Great Salt Lake Fremont people participated in the same iconographic tradition as other Fremont variants, producing distinctive wedge-shaped anthropomorphic figurines. Numerous examples from the Injun Creek, Bear River 1, 2 and 3, Levee, and Knoll sites (Aikens 1966:65–66; Aikens 1967*a*; Fry and Dalley 1979:60, 79; Shields and Dalley 1978:80) fit within the same broad pattern as seen in southern and eastern Utah, although the northern specimens generally appear more rudimentary (cf. Morss 1954). Eyes, jawlines, and sometimes other facial features are carefully shaped, and many figurines appear to be female, with prominently sculpted breasts positioned near the lateral margins of the torso. Some figurines have punctate or incised decoration, often in the form of parallel rows of pointillate impressions, but one fragmentary specimen from the Levee site bears a circular impression from a bone or reed tube and another is ochre-stained (Fry and Dalley 1979:60). Bases are smooth-tapered, cylindrical, and undecorated, described as "handle termini"—a subset of the more elaborate, occasionally flaring or turkey-tailed forms seen on specimens of more southerly provenience (Morss 1954:49). Appliqués and painting seen in southern specimens are also usually lacking. A collection of figurines from the Hinckley Mounds in Utah Valley (D. Green 1964) does possess the more elaborate decoration and shapes.

Seven stone objects from Injun Creek bear the same wedge-shaped form as the ceramic figurines, including tapered handle termini. Designated as figurines by Melvin Aikens (1966:46), these granite and slate objects lack facial features or decoration but were chipped into their distinctive shape and then their edges were ground smooth. Similar stone figurines were also found at the Willard site (42BO3) and Willard Mound (42BO4; David Yoder, personal communication, 2016); these sites, together with Injun Creek, are all on the east side of Willard Bay, representing a discrete cluster of artifact forms. Stone figurines appear to be uncommon elsewhere. A single example of an incised stone was found at the late component village of the Levee site (42BO107) that appears to bridge the gap between clay and other stone figurines of the area, in that anatomical features are represented (this and the Willard specimens are discussed in greater detail in Chapter 5).

Function of the figurines remains uncertain and seemingly contradictory. An early find in Range Creek Canyon, in east-central Utah was made in a small recess in a cave containing a "ruined room," their being set aside perhaps indicating some special significance (Morss 1954). Where provenience data is available for the Bear River figurines and figurine fragments, no special consideration seems evident: they were recovered in the overburden, fill, and from the floors of buried dwelling structures, in the general site area outside of structures, and from middens (Fry and Dalley 1979:table 2). Aikens (1966:65) felt "the quantity recovered [25 complete or fragmentary specimens at Bear River 1] indicates that they were probably important as cult objects in the religious life of the Bear River No. 1 site people." Ethnographically attested examples of unbaked clay figurines or "dolls" from Numic groups across the Great Basin (D. Fowler and Matley 1979:fig. 82; I. Kelly 1964:119; Steward 1941:243), "vaguely similar to the classic Fremont figurines" (C. Fowler 1994:109), were made either by children (Drucker 1941:109) or for them (Stewart 1942*b*:273).

The two dominant themes pertaining to figurine purpose—religious object and children's doll—are not mutually exclusive, and analogously appear within the highly elaborated kachina religions of the Hopi and other Puebloan peoples (cf. Parsons 1996; H. Tyler 1964; B. Wright 2008). As outlined by Barton Wright (2008:112–113), among the Hopi, kachinas are the personification of the essence or life force of all objects in the universe with which humans have had to historically interact through patterns of reciprocity and mutual obligation: they are a central focus of Puebloan religious belief. Visualizations of these spiritual beings have, over time, taken on customary forms, "[t]he more powerful the potential of the kachina, the more abstract… its features and symbols" (B. Wright 2008:113). In addition to the narrated form dictated through ceremony and oral tradition, visual interpretations are manifested in two ways: as male dancers impersonating these spirits in ceremonies and dances (at which time the dancer is believed to be imbued with the spirit of that kachina), and in the form of carved wooden "kachina dolls," replicas of the dancers, which are presented to Hopi girls by their male relatives as prayer objects. The dolls are virtually the only physical record produced of the dancers and the spiritual beings they represent.

> The purpose of the *tihu* [painted kachina dolls] is to link the girls and young women with the potential benefits brought by kachinas, for the spirits are irresistibly drawn to their own physical images. Although these small replicas are called "dolls" by the non-Hopi, they are not played with in the same way that non-Indian children play with their dolls. Hopi children are taught that the kachinas are to be treated with respect, and this applies to the *tihu* which are often referred to as being "like your sister." [B. Wright 2008:113]

The earliest known kachina dolls, one found on the upper Gila River being dated to approximately AD 1200, are made from "flat slabs of wood with the merest indication of a neck, the faces painted with native earth colors and a simply striped body plus a feather or two.... These flat forms have not only persisted but from them have evolved the three-dimensionally carved dolls of today" (B. Wright 2008:113). Though the handle terminus-type ceramic figurines of the Great Salt Lake area tend to be more cylindrical in shape, the Range Creek specimens described by Noel Morss (1954:4) are quite flat in cross section, the figurines having been molded on flat or slightly convex baskets, with the basketry imprints often being visible on their unadorned backs. While the relation between the Puebloan kachina religion and Fremont figurines has yet to be fully explored, Steward (1937*a*:87–88) did not hesitate to refer to wedge-shaped pictographs in Promontory Cave 1 with tapered lower bodies characteristic of the handle terminus style of Fremont figurines as kachinas.

Residential structures attributed to the Great Salt Lake Fremont are highly variable. At different locales, and and different times, people resided in coursed adobe or wattle-and-daub, shallowly subterranean pit houses (some with rooftop ventilation vents, others with access tunnels) as well as more ephemeral, wickiup-like surface structures (Aikens 1966:15–18, 1967; Fawcett and Simms 1993; Fry and Dalley 1979; Judd 1926:5–8; D. Madsen 1989:8; Shields and Dalley 1978; Simms et al. 1991; Steward 1933:9). On the basis of dated architectural components in the Bear River wetlands, Fry and Dalley (1979:5) delineated two phases in pit house development. The earlier Bear River phase, ca. A.D. 400-1000, is represented by ephemeral hunting camps and small villages of shallowly excavated, round structures, 2.75 to 4.5 m in diameter, with rough floors and central, basin-shaped hearths. In both camps and villages, numerous postholes and storage pits were observed with structures sometimes featuring vestibules, entrance ramps, rimmed hearths, and jacal-type construction. The later Levee phase, dated between A.D. 1000 and 1350, is represented by villages of larger, "squarish" structures 5 to 7.5 m across with "long, attached trenches that may have functioned as entrance crawlways or ventilator shafts" (Fry and Dalley 1979:5). Prepared clay floors, post-holes, and fire-hardened hearths were recovered from Levee phase structures at the Levee site, as well as mud plaster featuring the impressions of wood and grass thatching that hardened when one structure burned.

Dates for structures at the Levee and Knoll sites in the Great Salt Lake wetlands comprise some of the latest occurrences of the Fremont complex in the Great Basin. Four dates were obtained from four separate structures: 860 ± 110 B.P. (970-1308 cal. A.D., 94.1% probability), 810 ± 120 B.P. (995-1329 cal. A.D., 88.9% probability), and 710 ± 100 B.P. (1151-1427 cal. A.D., 91.9% probability) at the Levee site, and 640 ± 110 B.P. (1155-1473 cal. A.D., 95.4% probability) at the Knoll site (Fry and Dalley 1979; calibrated with OxCal v4.2.3, Bronk Ramsey 2013). While the huge standards of error on these dates cloud interpretation, the material culture from the dated structures gives signs of the changes that would typify the Late Prehistoric period to follow. Desert Side-notched projectile points predominate the Levee phase sites (Fry and Dalley 1979:5), and a Promontory Gray vessel was recovered in the fill of a tunnel-like extension from one late structure at the Levee site (Fry and Dalley 1979:21; see discussion of ceramic types and wares in Chapter 7).

Subsistence

The Great Salt Lake peoples are often seen as something of an outlier within the broader range of Fremont variability in that the role of horticulture is said to have been minimal, with greater evidence for an enduring reliance on wild foodstuffs (Dean 2001; Jennings 1978:178; Marwitt 1986:168). This generalization may be erroneous, and is based largely on sites excavated in the Bear River wetlands where corn was almost never observed—Bear River 3 being the exception (Shields and Dalley 1978). However, these estuary sites are only a subset of Great Salt Lake Fremont variability. Numerous low mounds associated with the collapsed and often burned remains of adobe-plastered or earth-covered, wood-framed, semi-subterranean structures formerly existed on the rich alluvial plains on the east side of the lake, in the Salt Lake Valley, and at numerous locations along Utah Lake (Judd 1926:3–21). Widely looted by relic hunters and subsequently destroyed by urban encroachment and farming, these sites in the most suitable parts of the region for intensive human occupation do not feature as prominently as better preserved but more marginally located sites in the archaeological literature. Thus understandings of Fremont life are coloured by what funding and access to private land have allowed, and by what few examples of settlements have survived. While many reports describe small camps and isolated hamlets, sites likely affiliated with Fremont horticulturalists in some parts of Utah once numbered in the hundreds of mounds (as at Paragonah; Judd 1926), and a degree of sample bias makes it very likely that the extent and complexity of sedentary life at this time has been understated (Simms 2008).

The Willard mound cluster, at the edge of the lowest lake terrace on the east side of the eponymous bay, was especially prominent. Seven low mounds there out of a cluster of 25 were excavated by Don Maguire, a local relic hunter, between 1880 and 1905, yielding "considerable quantities of beans, corn, [and] corncobs… in a charred condition" (D. Maguire, letter dated January 15, 1914, cited in Judd 1926:5). Other mounds on this prime farmland were plowed under. By 1915, only a single mound remained wholly intact, which was excavated by Neil Judd in his pioneering archaeological survey of the region on behalf of the Smithsonian Institution. His work revealed a burned, adobe-plastered structure with two sub-floor storage pits but no intact botanicals (Judd 1917:119–20; 1926:5). Though unsuccessful in finding direct evidence of maize, Judd felt evidence for cultivation existed in "the frequency with which well-shaped and deeply ground metates occur at this aboriginal village site. Numbers of them have been unearthed and stacked along the fences" (Judd 1926:8). Investigating the remaining traces of the Willard mounds decades later, Steward (1936:54) found a single maize cob. This find long remained the only direct evidence of horticulture in the area, although abundant evidence of maize in the form of kernels, cob fragments, stalk fragments, and pollen has since been found in Utah Valley (Billat 1985:92; Janetski 1990:254; Mock 1971:80–81; Richens 1983:115–16).

Subsequent excavation of 17 low mounds at Injun Creek, to the southeast of Willard Bay, meanwhile yielded jacal-covered pit houses, refuse-filled storage pits, a coursed adobe above-ground storage unit, and again, such an abundance of groundstone tools that Aikens (1966:14–15) argued maize horticulture must have been practiced there in conjunction with hunting and foraging in the nearby wetlands. The identification of maize horticulture based on the presence of groundstone alone is somewhat tenuous. Many of the grinding stones observed by Judd (1926:7) were deeply furrowed, possibly describing what is now commonly referred to as the "Utah-type" metate. This variant, with a secondary, shallower grinding platform on one end, seems to be associated with Fremont farming groups (Madsen and Simms 1998:262, fig. 3), but a conclusive demonstration of their use in grinding maize has yet to be made. Carling Malouf (1944:321) observed that other, presumably later metates tended to be flat and shallow in comparison, but he offered no suggestion of their use. Nicole Herzog and Anne Lawlor (2016:675) note that similarly simple metates from pre-Formative sites are generally assumed *a priori* to have been used in milling foraged seeds, but they argue that the presence of grinding stones should *not* be interpreted "as a proxy for increased reliance on seeds as a food source." Numerous ethnographic examples exist of grinding stones being used for processing meat, berries, insects, and pigment (C. Fowler 1986; C. Fowler and Liljeblad 1986; Riddell and Tuohy 1960; Schroth 1996; Steward 1933). Direct testing of residues on metates at Hogup Cave confirm their multipurpose use, including in the processing of starchy roots, or geophytes (i.e., bitterroot [*Lewisia rediviva*], biscuitroot [*Lomatium* spp.], yampah [*Perideridia* spp.], and camas [*Camassia quamash*]), that otherwise tend to be archaeologically invisible (Herzog 2014; Herzog and Lawlor 2016:675; Louderback 2014). Until more data are available, this cautionary note about groundstone's role in seed processing should perhaps also be extended to assumptions of their use in grinding corn.

Additional evidence for the extent of maize consumption and dietary variability among the Great Salt Lake Fremont comes from Coltrain and Leavitt's (2002) analysis of stable isotope values for carbon and nitrogen from bone collagen in dated human burials from the Willard Bay wetlands (86 individuals) and adjacent mound/pit house sites (7 individuals). Maize, a warm-season grass introduced from southern climates, utilizes a photosynthetic pathway that does not discriminate between the two stable isotopes of carbon found in atmospheric CO_2, carbon-13 (^{13}C) and carbon-12 (^{12}C); this process is referred to as C_4 photosynthesis (Peisker and Henderson 1992). Virtually all endemic vegetation in the Great Salt Lake area instead utilizes C_3 photosynthesis, a pathway common to plants of cooler climates that discriminates heavily against incorporation of $^{13}CO_2$ into cellular structures (O'Leary et al. 1992). Ingestion of maize results in detectably elevated ratios of ^{13}C relative to ^{12}C in the tissues of consumers (a notation expressed as $\delta^{13}C$), including teeth and bone. The two stable isotopes of nitrogen, ^{15}N and ^{14}N, meanwhile occur within a limited range of values in terrestrial plants that absorb ammonium (NH_4^+) or nitrate (NO_3^-) ions from soil, but because of the discriminatory excretion of ^{14}N in urea during protein synthesis in herbivores and carnivores, ^{15}N becomes increasingly concentrated in tissues with each step up the food chain (a ratio annotated as $\delta^{15}N$; Ambrose and DeNiro 1986).

While Coltrain and Leavitt (2002:464–474) noted considerable dietary variability overall, burials from the Willard mounds and some other pit house sites showed elevated $\delta^{13}C$ levels, confirming that maize was a significant component of the diet in locales where horticulture was suspected. Values for $\delta^{13}C$ also tended to occur in inverse proportion to $\delta^{15}N$, suggesting horticulturalists relied less on meat protein, while meat was a significant component of wetlands foragers' diets. Burials from sites on the Jordan River and near the mouth of the Provo River also yielded values for high-maize diets (Coltrain and Leavitt 2002:470, 475; Forsyth 1984; Schmitt et al. 1994). Sex- and status-based differences were noted in some cases: men tended to have significantly higher $\delta^{13}C$ values than women, as did males interred with unusually abundant grave goods at 42WB324, a Willard Bay wetland site (Simms et al. 1991:44–52). The trend towards greatly increased maize consumption among higher status males does not align with expectations for intensive horticulturalists but might reflect ceremonial consumption of maize beer (Coltrain and Leavitt 2002:474–75). Regardless of how it was consumed, by about AD 1150, all evidence for maize in the diet of Great Salt Lake Fremont peoples disappeared, signaling the end of farming around the wetlands and a shift to complete reliance on hunted, fished, and foraged foods (Coltrain and Leavitt 2002:476). The Fremont way of life, especially as represented by highly visible aspects of material culture such as adobe structures and ceramics,[10] persisted on these terms for another century (Janetski and Talbot 2014).

West of the Great Salt Lake: Foragers of the Fremont frontier

Patricia Dean (2001:199–200) suggested that the Great Salt Lake Fremont could be subdivided into eastern and western sub-areas, with the eastern subgroup comprising the farming and foraging settlements along the Wasatch Front discussed above and the western subgroup consisting of dry-desert foragers known principally from Danger Cave (Jennings 1957) and Hogup Cave (Aikens 1970) who subsisted off antelope, mountain sheep, jackrabbit, the seeds of alkali-tolerant plants, and cacti. The eastern/western classification of Great Salt Lake Fremont is not universally accepted—Janetski and Talbot (2014:fig. 10.1) do not include the west side of the Great Salt Lake or Promontory Point in their map of the Fremont cultural area. However, these cave sites are almost the only locales in the Great Salt Lake area where several distinctive aspects of Fremont material culture have been found, including one-rod-and-bundle basketry and “Fremont moccasins”—multi-piece moccasins sewn with seam along the length of the vamp and a deer dewclaw[11] at the heel (Aikens 1970:102–05; following Morss 1931). Rudimentary “hock” moccasins, fashioned from a single tube-like segment of hide peeled from the upper joint of a hind leg and stitched shut at the toe-end, appear to be particular to this western zone, being known only from Danger Cave and Hogup Cave, while “Hogup moccasins” with a puckered toe and seam running lengthwise along the middle of the vamp were found in earlier Archaic deposits together with isolated occurrences of the Fremont moccasin type (Aikens 1970:97, 102, 107–09; Jennings 1957:221–23). Dean (2001:199) conceded that as these perishable artifact types are generally lacking at open-air sites on the east side of the lake, their representativeness of the Great Salt Lake Fremont, and the affiliation of sites on the west side of the lake with the Fremont in general, are somewhat unclear.

Material culture

Ceramics reinforce the uncertainty of the affiliation of the western and eastern sites. The co-occurrence of numerous ceramic types is a common aspect of Formative period assemblages on either side of the lake, but the variants involved appear to differ on the east and west sides of the lake (Aikens 1966, 1967*a*, 1970; Allison 2002; Forsyth 1986; Jennings 1957; D. Madsen 1979*b*; Shields and Dalley 1978; Simms and Heath 1990). This involves variation within Great Salt Lake Gray, ceramic variants usually attributed to Fremont groups from the east and south (i.e., Uinta Gray, Snake Valley Black-on-Grey, Sevier Gray), Promontory Gray and other types often attributed to the Late Prehistoric period, and ceramics that cannot be easily assigned to any readily accepted type.

Conspicuously absent from sites on the west side of the lake are Fremont figurines. Incised stones of variable shape and decorative style are common, though, at sites such as Hogup Cave (Aikens 1966) and in the desert areas south and west of the caves, extending throughout the Central and Southern Great Basin, where they are first reported in Archaic occupations. More than 400 were found at Gatecliff Shelter, Nevada, alone (T. Thomas 1983*a*, 1983*b*); at Cowboy Cave, 45 incised and painted stones were found, nearly half of them from strata dated earlier than 4725 B.C. and occurring as early as 11,090-9070 B.C. (James 1983:249-50; Jennings 1980). They are also found at sites on the Snake River Plain and the northernmost Colorado Plateau of north-central Wyoming; they do not commonly occur anywhere else on the Colorado Plateau, however, where ceramic figurines are more commonly found (D. Thomas 2017).

Any semblance of residential sites in the western area to Fremont architecture appears absent. Instead, more ephemeral structures assumedly linked to the less permanent settlements of what have been termed mobile Fremont foragers (D. Madsen and Simms 1998; Simms 1986). At their most ephemeral, Fremont "houses" at Buzz-Cut Dune have been identified based on lenses of charcoal-darkened sand and concentrations of artifacts such as fire-cracked rock. Where the artifact concentrations and soil discoloration were confined to oval-shaped areas, their distribution may have been constrained by the walls of temporary structures such as wickiups, of which no other trace of their presence remains (D. Madsen and Schmitt 2005:59-71).

Subsistence

Specialized subsistence traditions west of the Great Salt Lake include hot rock boiling of Amaranthaceae seeds, possibly *Allenrolfea occidentalis* (iodine bush, often referred to as "pickleweed"), in tightly coiled, watertight basketry, as indicated by residue and wear analysis of Archaic period specimens at Hogup Cave (Herzog and Lawlor 2016). Among the basketry styles that gelatinized conglomerates of Amaranthaceae starch grains were found in was a specimen of rod-and-bundle manufacture, a technique that continued to be practiced during the Formative period at Hogup Cave (Aikens 1970; Herzog and Lawlor:666). Hot rock boiling in basketry has meanwhile been ethnographically observed among numerous groups in California and the Great Basin, comprising in some cases a useful supplement and in other cases an alternative to ceramic vessels among highly mobile peoples (Chartkoff and Chartkoff 1984; C. Fowler 1986; C. Fowler and Dawson 1986; Lowie 1909; Mason 1988; B. Ortiz 1991; Steward 1933; Sturm et al. 2016; Wheat 1967).

The portrait of broad-spectrum foraging on the west side of the lake is also reinforced by counts of faunal remains (i.e., number of identifiable specimens, NISP) and calculations of the number of individual animals hunters successfully hunted (i.e., minimum number of individuals, MNI). While diversity of species, as seen in NISP and MNI values alike, is certainly a noteworthy aspect of the record at sites like Hogup Cave, Aikens (1970:192) suggested that the bone counts themselves don't provide a perfect picture of diet and that the reality of caloric intake might have been more nuanced. Specifically, he reasoned that whereas smaller-sized game animals could be transported *en masse*, leading to many of their bones being at Hogup Cave, only portions of the biggest game animals hunted and butchered elsewhere would be transported, though the meat of the entire animal would still have been eaten.[12] Aikens (1970, following a technique developed by T. White 1953), calculated dressed meat weights for entire animals represented by only incomplete faunal remains at Hogup Cave to estimate hunting focus and intensity during each period of occupation. These values are approximate, as his analysis did not attempt to distinguish remains hunted by non-human predators that may sometimes have occupied the cave (cf. K. McGuire 1980), nor did he consider cultural preferences for hunted animals of a certain age or sex (e.g., avoidance of adult male bison, cf. Brink 2008:43–59; Henry 1897; Schultz 1919:60), but they nevertheless offer valuable insight. In the Formative-era deposits (ca. AD 400–1350), out of a total weight of approximately 9,114 lbs. of dressed meat, 69% would have been obtained from bison. This was a marked increase from Early Archaic and Middle to Late Archaic consumption patterns, and also reflected an overall intensification of hunting activity when calculated as an indexed value of weight harvested per kiloannum (Table 2.1; Aikens 1970:188–95).

Table 2.1. Proportions and intensity of hunting at Hogup Cave by period (using rounded values from Aikens 1970:195 and updated Early Archaic chronology from Martin et al. 2015).

	Proportion of dressed meat weight (%)								
Period	**Pronghorn**	**Bison**	**Deer**	**Sheep**	**Lagomorphs**	**Rodents**	**Carnivores**	**Total Dressed Meat Weight (kg)**	**Hunting Intensity Index (kg/ka)**
Early Archaic (10,100–3,400 cal. BP)	12	41	13	4	23	4	3	8,893.6	1,327.4
Middle/ Late Archaic (3,400–1,550 cal. BP)	30	51	6	2	8	1	2	2,405.4	1,300.2
Formative (1,550–600 cal. BP)	14	69	3	4	7	0.4	1	4,134.0	4,351.6
Late Prehistoric (600–100 cal. BP)	12	79	0	0	5	1	2	1,030.6	2,061.1

In part, these numbers reflect the sheer size of adult bison, which can range in weight from 318 to 545 kg for adult females and 544 to 907 kg for adult males, as opposed to smaller artiodactyls like pronghorn, which weigh only 35–70 kg (Krejci and Dewey 2009; Meagher 1986); dressed meat weights would be somewhat less—Aikens calculated 900 lbs (408.2 kg) for bison and 55 lbs (24.9 kg) for pronghorn, which is high for other estimates of field dressed weights of bison (54% of live weight; Halloran 1957) and low for pronghorn (56.6% [female] or 57.6% [male] of live weight; Field et al. 2003). While the accuracy of the estimates could perhaps be refined, the estimated MNI for bison of 22 out of the entire Hogup MNI for all species of 3,439 (Durrant 1970) renders the conclusion inescapable that bison were only rarely taken.[13] These numbers do not suggest any form of communal bison hunting, nor is there evidence for such with the other artiodactyl species. Using dental age profiles from pronghorn specimens, Byers and Hill (2009) determined that Hogup hunters relied upon small-scale encounter hunting throughout the Holocene. The occasional bison would present an inordinate windfall to groups practicing such opportunistic hunting.

For comparison, Jesse Jennings's (1957:224) comments on bison at Danger Cave are brief: "Bison bones were very rare but occurred." Grayson (1988:24, table 2) provided greater detail: out of a total NISP for all species of 3,513, spanning occupations dating back more than 10,000 years, 11 bones were from bison, including 2 teeth, 2 carpals, 4 phalanges, a metatarsal, a metapodial, and an innominate; of these, 8 specimens were from the uppermost Stratum V/VI (following Aikens's [1970:197–198] interpretation of the Danger Cave assemblage, a Formative period Stratum VI that went unidentified by Jennings must have been present within the Stratum V depth range). Though no MNI has been reported for these specimens, it would appear to be very low. A calculation of dressed meat weight even for the uppermost stratum would not be expected to yield comparable values to Hogup Cave, where even limited bison hunting success resulted in dramatic returns.

Maize was also present in the Formative-era deposits at Hogup Cave in the form of shelled kernels and trace amounts of macrofossils in human coprolites (Cutler 1970; Fry 1970). The absence of husks, cobs, and pollen would suggest that horticulture was not practiced in the vicinity (Aikens 1970:192; Kelso 1970). Janetski (1994:162) has argued that by being grown elsewhere, traded for, or otherwise procured, corn must have been integral to subsistence at some level to foragers on the west side of the Great Salt Lake during the Formative period.

Dean also tentatively included Lakeside Cave (D. Madsen 1989) in the western subarea, noting a long history there of grasshopper procurement (grasshoppers or locusts were also recovered in one Archaic period stratum from Promontory Cave 2; Joel Janetski, pers. comm., 2017). Grasshopper harvesting is exemplary of a broad-spectrum approach to extracting food resources from the arid landscape west of the Great Salt Lake. It was a coordinated, communal activity and required specialized knowledge, ethnographically attested among some Numic groups. Father Jean de Smet (1905:1033) described a Kusiutta or Paiute[14] hunt around 1840 as follows:

> They begin by digging a hole, ten or twelve feet in diameter by four or five feet; then, armed with long branches… they surround a field of four or five acres, more or less, according to the number of persons who are engaged in it. They stand about twenty feet apart, and their whole work is to beat the ground, so as to frighten up the grasshoppers and make them bound forward. They chase them toward the center by degrees—that is, into the hole

> prepared for their reception. Their number is so considerable that frequently three or four acres furnish grasshoppers sufficient to fill the reservoir or hole.

Insect collection would seem to represent a subsistence strategy of the western region that is of considerable antiquity.

The Great Salt Lake is situated at the intersection of several ecotones, including relatively lush wetlands and alluvial plains along the Wasatch Front, mountainous uplands and river valleys to the north and east, and arid scrubland and desert to the west. Following the pattern seen among Numic groups in protohistoric times, it is reasonable to anticipate that different groups would specialize in utilizing the resources of these different areas in the more distant past, and that social groups would differentiate themselves accordingly. Material patterns such as the ceramic variability characteristic of Great Salt Lake Fremont occupations should in part reflect the emergence of broad social identities shared among individual valleys or clusters of valleys (Janetski and Talbot 2014:122). Additionally, at what appears to have been the northernmost limit of maize horticulture, the variation might be representative of a mutual frontier shared between the most far-ranging Fremont groups (farmers and foragers included) and their contemporary neighbours.

Choosing the correct terminology to describe prehistoric groups of this area is uniquely difficult. Fremont groups cannot be defined as solely farmers or foragers. They likely switched between both, and for reasons that are fairly evident given the variability of precipitation cycles and year-to-year or decade-to-decade uncertainty about the reliability of either horticulture or foraging, especially in the Great Salt Lake wetlands (Coltrain and Leavitt 2002; DeRose et al. 2014). This general pattern can be encompassed within what is meant by the term Fremont Complex, but there also existed groups of people that never partook in maize horticulture, and yet who knew of maize and occasionally acquired it, for instance through raiding or trade. Opinions seem divided on whether these groups, too, were "Fremont" peoples, defined more broadly as the bearers of a suite of shared material culture traits irrespective of subsistence base (cf. Janetski and Talbot 2014; D. Madsen 1989; Madsen and Simms 1998). Though difficult to delineate, some limit must have existed to the Fremont interaction sphere that, like other broadly defined frontier zones, would have served as a vital locus of interaction and cultural exchange between groups whose ancestors historically farmed and those who did not (cf. Chase-Dunn and Anderson 2006; Chase-Dunn and Hall 1994; Lightfoot and Martinez 1995; Stein 2002). That frontier zone seems to include the west side of the Great Salt Lake.

East of the Wasatch Mountains: Uinta and other Fremont

Although this discussion is focused on the culture history of the Great Salt Lake and environs, a brief word is merited here on the other Formative-period peoples at the northern margins of the Fremont world, east of the Wasatch Mountains. This consideration is owed principally to the frequency with which a distinctive northeastern Fremont ceramic type, Uinta Gray, has been found at sites in the Great Salt Lake area, especially in the Bear River wetlands (Aikens 1967*b*; D. Madsen 1979*b*; R. Madsen 1977). The similarity between this type, identified by its almost exclusive reliance on crushed calcite and other calcium carbonate-rich tempers such as angular fragments of limestone (Truesdale and Hill 1999), and Promontory-affiliated ceramics is discussed in greater detail in Chapter 7.

In truth, the trans-Wasatch area treated here as the northern Colorado Plateau is a region at least equal in geographic scope and complexity to that of the Great Salt Lake Basin that is the focus of this work. Little justice to such an expanse can be done in the following brief summary, which is focused on the terminal Formative and early Post-Formative periods. At the heart of this discussion are two topographic features of central importance. First is the Green River, which flows south from its headwaters on the west side of the Wind River Range of the Rocky Mountains in west-central Wyoming to its confluence with the Colorado River in the Canyonlands region of southeast Utah, at which point the two streams are of nearly equal volume, with the Green traversing a greater length and draining a larger area (Colorado River Water Conservation District 2003).

Of no lesser note are the Uinta Mountains, an east-west trending range that runs uninterrupted from the east side of the Wasatch Mountains, on a parallel with the Utah Valley, some 200 km to the Green River on what is now the Utah-Colorado border. Higher than any other mountain range in what is now Utah and made impassable for parts of the year by snow and exposure to the elements, the Uintas present a formidable, if not impenetrable obstacle to human movement (Loosle 2000).

The Green River Basin, comprising the main part of the northern Colorado Plateau, can be divided into two sections, neatly separated by the Uinta Mountains. To the north lies the Wyoming Basin, an enclosed high-elevation desert area that spans the Continental Divide and connects, via South Pass and the North Platte River, to the northern Plains beyond. That part of the Wyoming Basin fed by the Green River on the west side of the Continental Divide is sometimes termed the Bridger Basin (Sharrock 1966:1–2) or the Upper Green River Basin (Frison 1971).

Rivers and streams borne from the western slopes of the Uinta Mountains follow courses through the Wasatch Range and flow into the Great Basin, including the Bear and Weber rivers that feed into the Great Salt Lake, and the Provo River that feeds Utah Lake. The mountains' northern and southern slopes both drain into the Green River, respectively via the Bridger and Uinta basins. Where the south-flowing Green River itself first meets the Uinta Mountains begin a dramatic series of canyons as the river shifts course to flank the mountains' northern and eastern perimeter: in order from upstream to downstream, Flaming Gorge, Red Canyon, Browns Park, and Ladore Canyon. Beyond this, an uplands plateau corridor extends 150 km east from the Green River to the Park Range of the Rocky Mountains proper (Sharrock 1966:1).

To the south and southeast of the Uintas is a broad intermontane region of basins, plateaus, and steep-walled canyons, beginning with the Uinta Basin and followed on the west side of the Green River by the San Rafael Swell and the San Rafael and Fremont river drainages. Just below Ladore Canyon on the Green River's east side is the confluence with the Yampa River, followed by the White, within present-day Dinosaur National Monument in northwest Colorado. Both rivers find their sources in the western slopes of the Rocky Mountains. Farther south is the Tavaputs Plateau, a rugged area of great erosional cliffs and steep-cut canyons that divide the Green River from the upper Colorado.

Concentrations of archaeological sites along the course of the Green River where it skirts the Uinta Mountains may reflect use of this area as a transportation corridor from the Uinta Basin to the Wyoming Basin, but hundreds of high-altitude archaeological sites in the Uinta Mountains, as well as ethnographically documented trails over them, attest to their also being frequently traversed in prehistory (Loosle 2000:284–85, 291; Sharrock 1966:102). In addition to crossing over, the High Uintas were likely a destination in their own right, presenting a cool, lush oasis for both big game animals and the people who hunted them, particularly in summer months (Knoll 2003; Loosle 2000; Nash 2012). The question of groups crossing from the Uinta Basin to the Wyoming Basin, and vice versa, is an important one. In general overviews of these regions' respective culture-histories, the Uinta Basin is viewed as the domain of Fremont horticulturalists throughout the Formative period (Marwitt 1986:162), while at the same time, the Wyoming Basin was the residence of mobile hunter-gatherers (Frison 1991:111–16).

Material culture

The Uinta Gray ceramic type is most prevalent in collections from the river basins immediately south and southeast of the Uinta Mountains. West of the Green, these include the major watercourses of the Uinta Basin, from which the ceramic type's name is derived (Ambler 1966; Spangler 2002; Steward 1936:18–19). The type appears almost exclusively at major Fremont-era pit house villages on the north side of the basin, typically concentrated on or near the floodplains of streams fed by the Uinta Mountains' south slopes—the Uinta River and Ashley, Dry Fork, Little Brush, and Cub creeks (Loosle 2000:279–80). On the east side of the Green River, Uinta Gray is found at sites on the lower Yampa and White rivers (Spangler 2002). The first formal descriptions of what has come to be known as the Uinta Gray type were from a small collection of sherds from Marigolds Cave on the Yampa River (Anna Shepard, cited in R. Lister 1951), and from the Turner-Look site at the southern end of the Tavaputs Plateau (Wormington 1955).

Uinta Gray is often considered diagnostic of the Uinta Fremont, although a number of regional and subregional variants and chronologies have been proposed for the Fremont of the northern Colorado Plateau (Ambler 1966; Breternitz 1970; Creasman 1981; Marwitt 1970; Nash 2012; Reed and Metcalf 1999; Schroedl and Hogan 1975; Shields 1970; Spangler 2000; Talbot and Richens 1999; Tucker 1986; for a comprehensive review, see Spangler 2002). The type is not distributed equally at sites across its range, and as elsewhere, the Fremont of this vast region likely included ethnically and linguistically diverse horticulturalists and hunter-gatherers, not all of whom produced the same material culture (cf. D. Madsen and Simms 1998). At Turner-Look, for instance, calcite-tempered Uinta Gray is found alongside a plurality of igneous rock-tempered Emery Gray, as well as Ancestral Puebloan trade pottery. This site is considered by some to be definitive of the more southerly San Rafael Fremont rather than the Uinta Fremont (Jennings 1978:184–206; Marwitt 1970:143–45), although it has also been considered among terminal Uinta Fremont sites (Shields 1970:14, cited in Spangler 2002:325).

Slight differences in projectile point stylistic frequency between the areas east and west of the Wasatch Mountains have already been noted, with Rose Spring Corner-notched and Uinta Side-notched points being most associated with Fremont occupations. Uinta Fremont occupations have otherwise been differentiated from other Fremont variants primarily by the rarity or outright absence of traits common in adjacent regions. This includes a paucity of ceramic figurines and ceramic bowls, painted and corrugated pottery, coursed-adobe granary structures, and troughed Utah-type metates (Marwitt 1970:141–42). Distinctive to the Uinta Fremont are two-handled ceramic vessels and large, shouldered bifaces, as well as settlement placement on the tops of buttes

(Shields 1970:2, cited in Spangler 2002:324). Floodplain settlements are also common, especially on the Green River in the vicinity of Flaming Gorge (Day and Dibble 1963; Loosle 2000:280).

The imposing Uinta Mountains might be considered a natural northern limit to the Uinta Fremont range, especially given environmental limitations of elevation, precipitation, and growing season that preclude maize being grown anywhere north of Flaming Gorge (K. Thompson and Pastor 1995:57). However, extensive use of Tiger chert and Sheep Creek quartzite, raw materials quarried at various locales on the north slopes of the Uintas (Loosle and Koerner 1998:56; Love 1977; Sharrock 1966), have been noted at many Uinta Fremont sites from south of the Uintas, which Byron Loosle (2000:288) has argued represents direct access through planned expeditions.

Whether Fremont materials on the north side of the Uintas are typical of the Fremont of the Uinta Basin is contested. Within a pattern of shifting regional settlement patterns in the terminal or post-horticultural period (post-AD 1050) identified by Jerry Spangler (2002), it is notable that the appearance of Uinta Gray in the Bear River wetlands coincides with the latest known Uinta Fremont sites. Kae McDonald (1994:286) posited a Bear River/Uinta Basin "interaction sphere" as a Fremont-era social network linking the Bear River wetlands sites to major sites in the Uinta Basin, and through which goods including *Olivella* shell, ceramics, lithic raw materials, and possibly bison meat were traded, but contemporaneity of major occupations in those two areas is not well-supported. Limited evidence exists of a late Fremont presence in the Wyoming Basin, part of the intervening range that separates the Great Salt Lake from the Uinta Basin, but maize, bone gaming pieces, rock art with distinctive trapezoidal anthropomorphic shapes, and Uinta Gray from north of Flaming Gorge have been variously interpreted as representing seasonal forays by Fremont-affiliated groups from the west (i.e., Great Salt Lake) or south (i.e., Uinta), or the adoption of similar technology by non-Fremont peoples (Day and Dibble 1963; Francis and Walker 2000; Hakiel et al. 1987; Hill and Wolfe 2017; McKibbin 1992; C. Smith 1992:70; Spangler 2002:357–58; Truesdale and Hill 1999).

On the northeast flank of the Uintas, seasonal maize horticulture is well documented immediately downstream of Flaming Gorge itself, in the Red Canyon and Browns Park areas (Day and Dibble 1963; Johnson and Loosle 2002; Loosle and Johnson 2000). While attributed to Fremont peoples, these occupations are associated with brush structures instead of pit houses, unique slab-lined storage cists were constructed, pottery possesses a range of ceramic tempers including but not limited to crushed limestone, and painted ceramic variants are known (Loosle and Johnson 2000; Knoll and Loosle 2006; Nash 2012:124–25). Furthermore, obsidian use focused principally on sources north of the Uinta Mountains, while Uinta Basin sites feature a reliance principally on southern sources (Johnson and Loosle 2002; Knoll and Loosle 2006). Based on these and subsistence-based differences discussed below, Michelle Knoll and Byron Loosle (2006) have proposed the term Red Canyon Fremont for those groups north of the Uinta Mountains.

Subsistence and chronology

As represented by distinctive material culture and association with maize horticulture, the term Uinta Fremont most directly applies to the Uinta Basin, where proportions of Uinta Gray ceramics are highest, and ceramic use in general is most common, at sites dating to between AD 550 and 1050, accompanied by construction of semi-subterranean pit houses and some degree of reliance on horticulture (Spangler 2002; Talbot and Richens 1999). Elsewhere, over broad swathes of the northern Colorado Plateau, pottery, maize, and dry-laid masonry architecture are usually concentrated at specific points on key drainages, often with access to piñon pine as an additional major food resource (Spangler 1993; 2002:327–28). Sites with a suite of attributes associated with horticultural sedentism are far less common than those associated solely with more mobile hunter-gatherer activities in the Yampa and White River drainages (Reed and Metcalf 1999; Spangler 2002:327–31). Reliance on big game, especially mountain sheep, at uplands settings and "low-level," semi-sedentary horticulture have been noted for the north slopes of the Uinta Mountains and Flaming Gorge (Knoll 2003; Knoll and Loosle 2006; Nash 2012), declining after ca. AD 1050 but persisting until at least AD 1410 (Johnson and Loosle 2002; Talbot and Richens 2002). On the Tavaputs Plateau, a strongly sedentary, horticulturalist focus has been noted for a small number of sites that proliferated relatively late, between AD 900 and 1300 (Spangler 1995, 2000, 2002:327–33, 357).

After AD 1050, intensity of occupation declined in the Uinta Basin and Yampa and White River drainages, accompanied by a reduction in horticulture. Jerry Spangler (2002:340–42; 357) has suggested that populations withdrew during the period between AD 1050 and 1300 to higher-altitude environmental niches more favourable to mixed foraging activities in the Uinta Basin, the Tavaputs Plateau, and the Flaming Gorge area, while at Douglas Creek on the upper White River drainage, horticultural subsistence continued to ca. AD 1210 (Creasman 1981). In these areas, both before and after the decline of maize horticulture, bison are only sparsely represented in broad-spectrum faunal assemblages which are instead dominated by such species as mountain sheep, mule deer, and cottontail rabbit (Leach 1970; Loosle and Koerner 1998; McKibbin and Rood 1992:300; Spangler 2002:278). Exceptions where bison remains are abundant are quite scarce, limited to two pit house village or rancheria sites in the Douglas Creek area, where only sand and sandstone-tempered ceramics were present: Rim Rock Hamlet (5RB2792), ca. 917–991 cal. yr. AD (Baker 1998), and the very late-dating Sandshadow site, ca. 1218–1412 cal. yr. AD (Baker 1994:3.7, 6.8).

Fremont-contemporary sites in the Wyoming Basin beyond Flaming Gorge usually possess pit features, small basin-shaped residential structures, local ceramic types possibly imitative of Fremont variants, and evidence of seed processing (Reed and Metcalf 1999). Here, too, intensive bison utilization is an anomaly despite bison being locally "omnipresent" throughout prehistory (Sharrock 1966:92–93, 174), but one site with Uinta Gray pottery, 48UT199, does include an intensively bison-focused occupation (C. Smith 1992; see discussion in Chapter 8), while the Woodruff Bison Kill, where 1,150 identifiable fragments of bison bone were recovered, dates to the early Formative Period (AD 615 ± 90) but is not associated with any distinctively Fremont artifact types (Shields 1978:53; cf. Grayson 2006). Available radiocarbon dates for what has been termed the Uinta Phase in the Wyoming Basin precipitously decline, as in neighbouring Fremont areas, after ca. 700–900 BP, while the onset of a subsequent appearance of Numic-associated Uncompahgre Brownware and Intermountain Wares remains uncertainly dated within the Late Prehistoric Period (Metcalf and McDonald 2012:184–85; K. Thompson and Pastor 1995).

Late Prehistoric: The Promontory and Protohistoric Phases

While the end of maize horticulture should define the terminus of the eastern Great Basin and northern Colorado Plateau's Formative period, the beginning of the subsequent Late Prehistoric period is often recognized instead by the denouement of the Fremont lifeway, marked by the end of occurrences of their distinctive material culture in the archaeological record, if not the disappearance of Fremont people themselves. Thus with a transition period beginning around AD 1200, the Late Prehistoric period refers to the period after ca. AD 1350 (Janetski 1994:174), continuing until European contact. During the Late Prehistoric, people returned to a reliance on wild foods and relatively mobile, dispersed residential patterns. Reminiscent of Desert Archaic patterns, differences exist in the material culture of the Late Prehistoric, though virtually all evidence for the period comes from poorly preserved open-air sites, limiting comparison almost exclusively to non-perishable diagnostics such as ceramics and projectile points (Janetski 1994:159); such scant evidence exists for this era that it received no dedicated chapter in the Great Basin volume of *The Handbook of North American Indians* (d'Azevedo 1986). Some of the few exceptions to poor preservation are from the uppermost strata of the dry caves on the west side of the Great Salt Lake and the dry desert beyond—Hogup Cave and Danger Cave—as well as the Promontory Caves themselves, where a more extensive record exists (Aikens 1970; Jennings 1957; Steward 1937*a*). Janetski (1994:174–176) subdivided the Late Prehistoric period into Promontory and Protohistoric phases, with a transition at about AD 1600 marked by a discontinuity of ceramic traditions, greater use of uplands, changes in burial practice, and perhaps also changes in basketry, though evidence is admittedly scarce.

Numic continuity vs. Numic expansion

The culture history of the Great Basin and northern Colorado Plateau was long viewed by many archaeologists as a slow, *in situ* developmental progression (Jennings and Norbeck 1955; Jennings 1956, 1957; Rudy 1953; D. Taylor 1957). Drawing from Julian Steward's (1937*b*) ethnographic observations of a foraging lifestyle and high residential mobility driven by resource scarcity among the Western Shoshone, Jesse Jennings (1953, 1957; Jennings and Norbeck 1955) went so far as to propose that the Desert Archaic tradition continued uninterrupted through to the time of European contact among Numic groups throughout the Great Basin culture area, even as some groups took up and then eventually abandoned horticulture.

Steward himself had strong doubts about such a hypothesis, noting numerous differences between Shoshone craft production and the archaeological assemblages of the Promontory Caves. Lacking any archaeological reference point for Shoshonean assemblages, he based his comparisons of the Promontory assemblage to knowledge of material culture learned from Shoshone informants in his own and Robert Lowie's ethnographic fieldwork in Utah, Nevada, and Idaho (Lowie 1909, 1924; Steward 1937*a*:82–86). Steward believed the ancestral Shoshone had adopted traits of the pre-Puebloan Basketmaker culture of the more distant Southwest and had spread northward and eastward comparatively recently, perhaps only within the last 1,200 years (Steward 1937*b*, 1938, 1940). His estimates, though, were unsupported by any chronometric evidence. Putting aside anomalous findings from the Promontory Caves, Jennings used dates from sites such as Danger Cave to show considerable antiquity to the Desert Archaic way of life and, by extension, to the Numic one in the northeast Great Basin (Jennings 1957).

An early criticism of the proposition of a single persistent cultural identity was made on cultural ecological grounds: that is, given the patchy, scarce, and unstable distribution of subsistence resources throughout much of the Great Basin, diverse foraging practices and small population sizes were an inevitable adaptation for inhabitants of the region. In other words, *any* hunter-gatherers drawn into the Great Basin, regardless of linguistic affiliation or prior material culture, over time would come to leave an archaeological footprint resembling Desert Archaic culture (Hopkins 1965:50). Linguists presented another challenge to the narrative of a monolithic development of Numic peoples across their full historic range. Sydney Lamb (1958) observed that the three main divisions of the Numic languages could each trace their origins to a different part of a tightly clustered home region in the southwestern Great Basin, and the daughter tongues had each changed from this home region only little (see also Golla 2007). While recognizing the limited ability of glottochronology to accurately date such a series of events, Lamb urged archaeologists to consider the possibility of a recent Numic expansion north and eastward to their distribution at the time of contact, perhaps only within the last thousand years. Lamb's and other lexicostatistical studies (Goss 1968; W. Miller 1986; W. Miller et al. 1971) would suggest that the Numa replaced earlier Archaic and Formative-era peoples in the eastern Great Basin and northern Colorado Plateau.

Material culture

The timing and nature of a population-level replacement by Numic groups remains contentious (see contributions in D. Madsen and Rhode 1994). Especially problematic is the characterization of a suite of material culture attributes that can be viewed as typically Numic. Noting that Numic peoples became locally specialized in the varied habitats and resources of the Great Basin and drastically changed their lifeways as they spread to the regions beyond, Catherine Fowler (1994:112) has argued that though a unifying general outline in their diverse material culture does exist, it is so broad as to do "no good for ethnic definitions since the general outline extends well beyond Numic borders." If any "common base" for all Numic groups can be claimed, Fowler has pointed to "plain and diagonal open and close twined basketry in an up-to-the-right direction of twists," as well as coiled basketry, linear nets, tule sandals, composite fire drills, and linear stone pipes, especially in early or Proto-Numic occupations. The utility of these items for identifying prehistoric Numic sites can be questioned given that they are almost all perishable and are thus unlikely to be recovered in a vast majority of archaeological contexts.

Among the non-perishable artifacts that are frequently cited as diagnostic of Numic occupations are triangular-bladed, shouldered stone bifaces frequently referred to as "Shoshone knives" (Frison 1971; Janetski 1994:170). Their distribution corresponds with post-Formative population movements in the eastern Great Basin and northern Colorado Plateau, but it is unclear whether they appear over the full Numic range.

The other diagnostic artifact class commonly associated with Numic expansion is a cluster of flat-bottomed, conical, or pointed-bottom ceramic styles variously referred to under such terms as Intermountain Ware, Brown Ware, Shoshone Ware, and in the southern extent of its range, Southern Paiute Utility Ware, which differ in form, if not in construction or surface treatment, from invariably round-bottomed Fremont vessels (Dean 1992; Fairley 1989; Janetski 1994:195–97; Jennings 1978:237–238; D. Madsen 1975; Pippin 1986; Rhode 1994; Rudy 1954; Simms 1989; Tuohy 1990; G. Wright 1978). The collective term Intermountain Brown Ware Series has been used (Pippin 1986; Tuohy 1990), but is inconsistent with typological models that distinguish between ware, series, and type (Colton and Hargrave 1937; Watkins 2009; discussed in Chapter 7). Though imperfectly resolved, the term Brown Ware is the inclusive shorthand most commonly applied here (following Janetski 1994:164–66), with Intermountain Ware being used in specific reference to northeastern variants.

Based on the non-standardized forms of Southern Paiute pottery, Catherine Fowler (1994:109; see also D. Fowler and Matley 1979) has questioned the longevity of some Numic ceramic traditions and noted they may have been copied from neighbouring forms. Not all Numic groups had a ceramic tradition at the time of contact, and the Brown Ware tradition could have been taken up independent of Numic expansion at different times, diffusing from south to north first from the Virgin Anasazi beginning about AD 500, and then with later modifications (possibly via Fremont groups) to the Southern Paiute, Shoshone, and Owens Valley Paiute (Baldwin 1945:390; Tuohy 1973:58; Rhode 1994:124–125). If the diffusion model is correct, it could be difficult to distinguish between cases where Brown Ware represents the spread of a technology to groups already in place or the movement of the bearers of that ceramic tradition themselves. However, even if the ceramics carry with them uncertainty, differences between Fremont and Brown Ware vessel forms still make the latter a useful chronological marker. Until such time as better data from other sources are available, pottery remains the best available means of documenting Numic expansion.

Dating the Numic expansion

The earliest Brown Ware variants, dating to the 11th century AD, are from sites in the Virgin River area and elsewhere in southwestern Utah and southeast Nevada, where it is commonly referred to as Paiute pottery; similar "Paiute-Shoshone pottery" appears in the eastern Great Basin in the 14th century (D. Fowler et al. 1973; D. Madsen 1975; Rudy 1954; Walling et al. 1986). These earliest examples were invariably found in strata that also contained Fremont sherds, Anasazi sherds, or both, though at sheltered sites in Clear Creek Canyon, the Brown Ware becomes most abundant in later occupations. While such sherds are commonly found in association with Fremont Ware in this area, the Brown Ware is only found at upland and cave sites near Fremont villages; it is never found in the villages themselves (Janetski 1994:165–66).

Intermountain Ware does not appear in the archaeological record of the Great Salt Lake area and adjacent regions until comparatively late, including the uppermost strata at Hogup Cave. Direct dated Intermountain Ware from Ogden Canyon, as well as parts of southwestern Wyoming and southern Idaho where a Numic presence is ethnographically well attested (Frison 1971; Holmer 1990:47; M. Stuart 1993), are from sometime after AD 1600, far removed from the post-Formative transition. There thus appears to be "very shallow time depth for Numic presence" (Janetski 1994:178) in places formerly occupied by horticultural and foraging Fremont peoples in the Utah Valley and northern Wasatch Front, though Hogup Cave and Danger Cave exhibit Intermountain Ware mixed with Fremont-type sherds in what may be earlier contexts (Aikens 1970; Jennings 1957).

Because of the geographic limits of maize farming during the Formative Period, there is no convenient horticultural interval to separate the Desert Archaic from the Late Prehistoric in much of the central and western Great Basin. Evidence for an archaeological transition in accord with the Numic expansion hypothesis in those areas is varied. In the Carson and Humboldt Sinks of western Nevada, Gordon Grosscup (1956) observed a cultural break around 1,000 BP. David Hurst Thomas (1971, 1982) noted continuity from the ethnographic present to at least 2,500 BP in central Nevada's Reese River drainage, which Aikens and Witherspoon (1986) proposed could extend to the end of the mid-Holocene warm period, ca. 5,000 BP. This would suggest a Numic presence if not over the entire Great Basin, then at least the central portions of it well before the onset of horticulture and the Fremont phenomenon.

Authors including David Madsen (1994) and Joel Janetski (1994) have suggested that as both Fremont and Ancestral Puebloan horticulturalists, the latter at such major site complexes as Mesa Verde, began to withdraw from the Great Basin and Colorado Plateau sometime after AD 1200 (the direction of this out-migration being a major topic of discussion in its own right; see Chapter 3), hunter-gatherers who had perhaps always lived along the horticulturalists' western periphery or even in the interstices between farming enclaves simply moved in. "Presumably, the immigrant or expanding hunter-gatherers were Numic speakers" (Janetski 1994:178). While it remains difficult to archaeologically demonstrate the timing of this Numic expansion, Madsen (1994) has argued that through much of the former range of Fremont and Ancestral Puebloan peoples, there are few conceivable alternatives for who else the successors could have been.

Promontory Culture and Promontory Phase

An important exception to the narrative of post-Fremont Numic expansion exists along the northern perimeter of the Fremont world, where Julian Steward's excavations of the well-preserved deposits at the Promontory Caves, both on the west side of Promontory Point and at Little Mountain near the Bear River wetlands, provide an incredibly detailed record of a people who stand out as an anomaly in the culture history of the eastern Great Basin. Instead of being farmers or broad-spectrum foragers, they were almost exclusively big game hunters, and especially eaters of bison (Steward 1937*a*:81–82; Johansson 2013). Bearing distinctive material culture and appearing to post-date the horticultural era, Steward labeled this the *Promontory Culture*.

To determine the position of the Promontory Culture in Great Basin culture history, Steward compared trait lists of the 12 cave assemblages (drawing mostly from Cave 1) with other sites in western Utah and with his extensive ethnographic knowledge of Numic-speaking peoples. He reported some evidence of "Puebloan" influence—at the time, Steward referred to the Fremont area as the "Northern Periphery" of the Puebloan world. He also identified a significant number of traits that were intrusive in the region, which he attributed to northern Plains or even Subarctic influences, in part related to their reliance on big game. Noting an absence of many of the distinctive items that would characterize a Shoshone or other Numic occupation and the presence of even more features he felt were non-Numic in character, he strongly suspected that the inhabitants of the caves represented an intermediate stage in the migration of ancestral Southern Dene peoples from the Canadian Subarctic to the American Southwest (Steward 1937*a*:84–87, 1938, 1940, 1943, 1955*b*), as had been postulated by Edward Sapir (1916:81–82, 1936) based on linguistic evidence for connections between Diné and Northern Dene languages, and by Franz Boaz (1897) based on elements in Diné oral tradition of northern origin. In recent reviews of Steward's collections and newly excavated materials, including several artifact classes such as bone fleshing tools, D-shaped tabular scrapers (known as *chi-thos* to Subarctic archaeologists), knotless netted hunting bags, and most importantly, moccasins, John W. Ives (2014:149; Ives et al. 2014) has reaffirmed Steward's suspicions. The Promontory Culture occupation of the caves appears to represent an early episode of migratory Proto-Southern Dene incursion into the northeastern Great Basin.

That is not to negate a Shoshonean presence at the caves: the abundant Promontory Culture materials appear interposed above earlier Archaic (and possibly Formative) deposits at

Cave 1 and Cave 2, and below sparse Shoshone-affiliated materials. Steward (1937*a*) acknowledged the life history related to him by his Northwestern Shoshone informants, Posiats and Old Diamond, about how the latter was born in a cave on the west side of Promontory Point and resided at times in Cave 1 in his youth. Steward suspected, though, that a story they shared with him about Kusiutta at one time attempting to smoke out the Shoshone inhabitants of Cave 1 appears in many forms among various Numic groups, with different opposing forces and at different locations, and "may be merely a tradition that has become connected with a large number of caves in the Great Basin. A similar tale was told of Lovelock Cave in Nevada. A Gosiute informant, Moody, had also heard the story but laid the blame on the Ute of Utah Lake" (Steward 1937*a*:7). Another variation of this story was told by Thomas Whitaker, a rancher from the east side of Promontory Point, to the University of Utah's Byron Cummings (1913:3) as his motivation for seeking out and "discovering" Cave 1 in 1912:

> When a boy herding sheep he learned from an old Indian of a tradition which relates how the last of a tribe of Indians inhabiting the promontory were driven to make a final stand in a large cave in the cliffs, and there all perished from starvation and the attacks of the besieging Shoshones. Mr. Whitaker had hunted for this cave for years as he gained opportunity, and finally about three weeks ago came upon a large cave answering to the Indian's description. It is located on the western slope in the limestone formation about three miles above Mr. Sheahan's ranch[15].... On a smooth face at the back of the cave has been painted in red the figure of a medicine man or priest with its pointed animal ears and crudely-formed body. By removing eight to twelve inches of accumulated dust and small [stone?], you come upon the fireplaces and beds of cedar bark [,]... pieces of buffalo skin and

> strips of buffalo hide twisted and tied for rope, and many moccasins made of the skin of the same powerful beast.... Now and then you pick up a piece of a broken clay bowl or pitcher. These were dark gray in color... [and] are like the crudest of the pottery found in the mounds near Willard City.

Cummings visited the caves with students from his American Archaeology class in the summer of 1912, some three weeks after Whitaker, and shortly after excavating several of the Willard mounds that were later described by the Smithsonian's Neil Judd (1917, 1926). Many of the themes expressed by Cummings exemplify the unique features of the Promontory Culture: their reliance on bison, their many moccasins, and even their distinctive pottery, though contrary to his report, no examples of pitchers, defined by the presence of a handle, and typical of Fremont pottery, are known from the Promontory collections. Steward disagreed on the similarity of the Promontory ceramics to the specimens from the Willard mounds, which he had also investigated before visiting the caves (Steward 1933, 1937*a*:9), but the theme of the pottery being similar to "cruder" specimens found at Great Salt Lake Fremont sites became prevalent in later ceramic analyses (notably Forsyth 1986; see discussion in Chapter 7).

As for the oral tradition related by Old Diamond, Moody, and Whitaker, it is of interest for its description of conflict between one Numic-speaking group and another, or possibly with an unknown, presumably earlier group. However, neither Cummings nor Steward found any traces of a pitched battle, nor have any human mortuary remains ever been found there that would correspond with the annihilation of a people or, for that matter, with the death of any group member whatsoever.

The caves were subsequently visited by Andrew Kerr from the University of Utah and by numerous amateur collectors prior to Steward's work in 1930 and 1931, by which time the deposits had been substantially impacted (Steward 1937*a*:7). Most evident is the absence of the 8- to 12-inch layer of dust or rocky debris over the well preserved cultural deposits described by Cummings. Steward (1937*a*:9) noted an upper stratum of 4 to 6 inches of cow manure, but even this was no longer evident by the time of our Promontory research team's excavations at the front of Cave 1 beginning in 2011. Discontinuities in the uppermost remaining strata suggest they were sheared across during a previous excavation (Figure 2.1). This was probably the work of Steward, whose report indicates excavation to an unspecified depth over a large portion of the front of the cave (1937*a*:fig. 2).

Material culture

Many aspects of the Promontory Culture assemblage are common to both earlier Fremont and later Numic peoples, as well as to the Great Basin and even the Southwest as a whole—a situation similar to what Fowler (1994) described for the "common base" of Numic assemblages. Some artifacts may serve as chronological markers—for instance classic Desert Side-Notched projectile points with deep basal notches, which became prevalent in the Late Prehistoric—but not as markers of an ethnic identity recognized by the bearers of that technology themselves. Fragments of single-rod and rod-and-bundle basketry suggest some degree of continuity with earlier Fremont peoples, but not with the later Numa. The absence of any evidence of maize indicated to Steward that the Promontory Culture post-dated horticulture in the eastern Great Basin. Steward also noted the conspicuous absence of some aspects of Shoshone material culture, such as

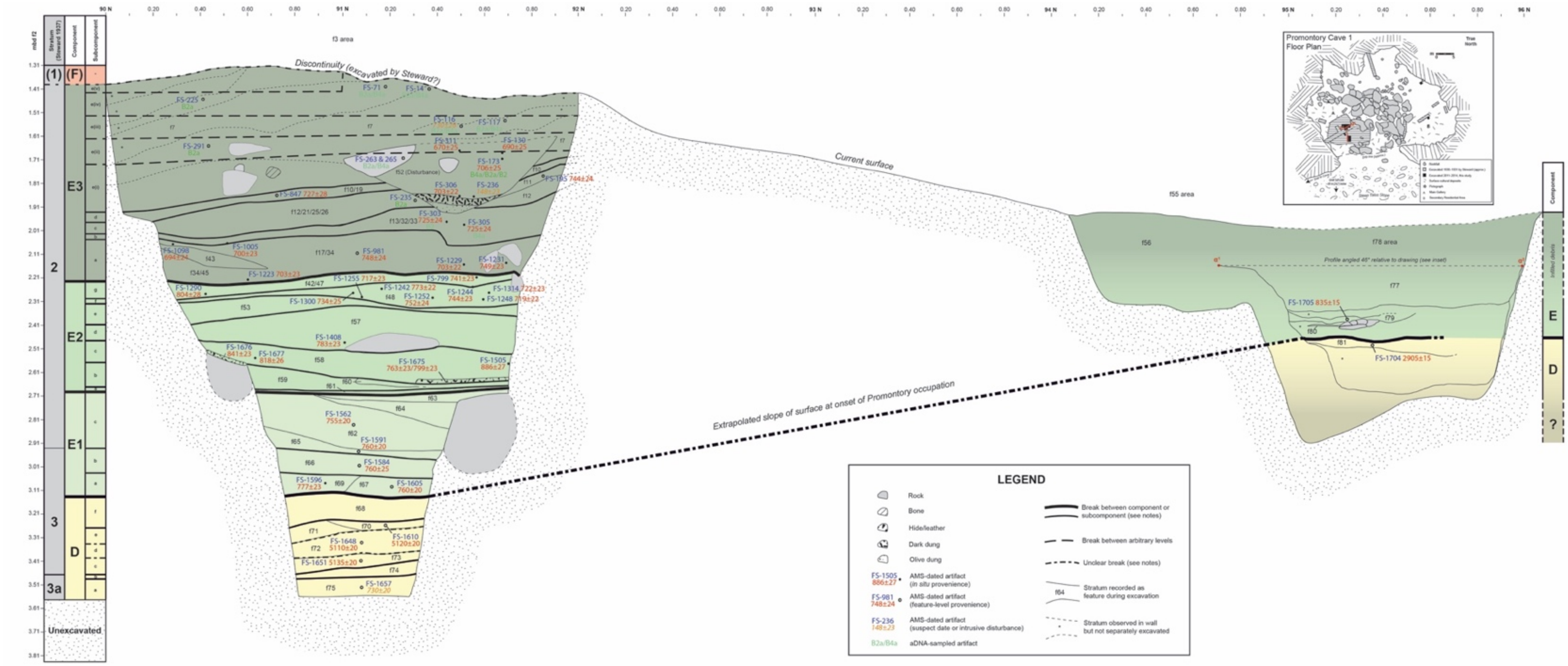

Figure 2.1. Profile of excavation units in Promontory Cave 1 (42BO1) at 99 E (sondage at front of cave, left) and Steward's Trench A (right). Excavated features are sorted into pre-Promontory (D) and Promontory (E1–3) components, with Steward's (1937*a*) strata noted for comparison. Figure compiled with contributions from Scott Ure, Katie Richards, Lindsay Johansson, Jennifer Hallson, John W. Ives, and Gabriel Yanicki. See Appendix A for an explanation of the strata and substrata as used here.

groundstone tools, large bird or rabbit nets, twined basketry, and single-piece grooved wooden arrows; instead, cane-shafted arrows with greasewood foreshafts are common (Steward 1937*a*:84–86, 122). Shoshone knives and conical or flat-bottomed pots are also absent.

Among the more unique aspects of the Promontory Caves' inventory are a large number of soft-soled, two-piece (and often three- or four-piece) moccasins. The specimens collected by Steward are made mainly of bison hide (occasionally deer or antelope), with an inverted T-seam at the heel and a puckered, rounded toe made by gathering up the front and sides of the sole piece and stitching them around a separate vamp piece; heel tabs and ankle wraps are also common. In both design and execution, the Promontory specimens are radically different from rudimentary one-piece hock moccasins and hobnailed Fremont moccasins, and are instead remarkably similar to ethnographically observed Subarctic Dene and Algonquian footwear, fitting the Bata Shoe Museum (BSM)'s 2(Ab) and 2(Bb) classification of moccasin types (Billinger and Ives 2015:78; Hatt 1916; Ives 2014; Steward 1937*a*:52–53, 57–70; J. Thompson 1990, 1994; Webber 1989).

In the late 1870s, while compiling a treatise on the Plains Sign Language that was used as a *lingua franca* across much of North America (and so travelling extensively to record information from "sign-talkers" from different groups), William Philo Clark reported a number of useful insights about the social information encoded in moccasin production:

> In former times, the moccasins of the different tribes were made so differently that for an Indian to see the moccasin was to know the tribe; and even now, in its shape, construction, or garnishment, it is the strongest characteristic mark of each tribe, so far as any clothing or covering is concerned.... The manner of cutting, making up, the beadwork, etc., are so characteristic as to be unmistakable. [W. Clark 1885:257–259]

Similar observations were reported by other frontiersmen: “Each tribe of Indians make their shoes a different shape.... Unlike their arrows, they seldom or never change their moccasins” (Belden 1872:154). The moccasins are an integral line of evidence into the northern affiliations of the Promontory Culture: while doubts can be cast on the relationship between ethnic identity and many artifact classes (see Chapter 4), moccasins are unusual in that they commonly did signal membership within a group, both by group members to each other and between them and outsiders.

Included in the Promontory moccasin types are many very finely stitched examples, as well as specimens featuring piping and porcupine quillwork, demonstrating considerable care and craftsmanship—or rather, craftswomenship: while men could make and repair their own moccasins, their making is usually included in the domain of women’s craft specialization. “The more the person is thought of who is to wear them the more work will be put on the moccasins” reported Charles H. Beaulieu (cited in W. Clark 1885:258). Moreover, "[i]t is no difficult job [for a woman to] cut out and sew up a plain pair in half a day. If they are beaded, however, it takes a week or more to finish them, and those ornamented with porcupine quills require a month of patient labor” (Belden 1872:153).

So many moccasins were collected in Steward’s excavations—237 of the 2(Ab)/2(Bb) type, along with one modified variant, five that do not conform to the Promontory type, and three undeterminable fragments, all but two coming from Cave 1 (Billinger and Ives 2015; Steward 1937*a*:57)—that Patricia Dean (2001:199) inaccurately labelled the Promontory Caves a “storehouse for moccasins.” Many other artifact classes show a similarly high frequency of deposition, suggesting that it was the intensity of occupation there that was exceptional. While considerable hideworking activity that included moccasin manufacture did take place, the majority of the moccasins (73.1%) were substantially worn and discarded, being either patched, resoled, or damaged beyond repair. Based on a comparison of moccasin sizes to modern demographic data, both adult males and females were present, but a large majority of the moccasins (82% of individuals identifiable by unique, intact moccasins) belonged to subadults or children (Billinger and Ives 2015:83–85). The moccasins demonstrate the presence of a thriving community, in terms both of the people who made them and the people who wore them.

Among the other artifact classes featured prominently in Steward's inventory of the Promontory Culture are numerous items associated with games of skill and chance, among them cane and beaver-tooth dice, bone "gaming pieces" (a term often applied in Great Basin literature to what were also most likely dice, cf. M. Hall 2009), netted hoops and feathered darts, and even a juniper bark ball (Steward 1937*a*:23–26). The gaming materials are noteworthy both for their diversity—multiple forms of some games, especially dice, are present—and their ubiquity. The scope of this latter fact is only hinted at in Steward's report: where he identified 24 examples of cane dice, short segments of *Phragmites australis* (common reed) that had been split longitudinally and marked on their exterior surface with rows of diagonal slashes, 153 more have since been recovered from Cave 1 since excavations were renewed there in 2011, including 86 from a single 2 m x 1 m excavation trench. The expanded Promontory gaming inventory and its significance has been reviewed by Yanicki and Ives (2017) and is presented in Chapter 6. It is easy to fall into a pattern of speaking in superlatives when describing the Promontory assemblage— the most extraordinary preservation, the finest moccasins, and as will be detailed below, the most extensive use of bison. The gaming pieces, for their sheer number, are deserving of a place on that list.

While a Promontory Culture presence has been identified at other sites in the Great Salt Lake area, its recognition elsewhere is greatly hampered by preservation conditions. Moccasins, gaming pieces, and other perishable artifacts are rarely encountered, limiting comparisons between sites to non-perishable items. It is Steward's description of the pottery from the caves that is most frequently called upon in identifying Promontory-affiliated occupations. His original definition, drawing not only from the ten Promontory Caves in which it was found, but also Black Rock Cave and the Tooele Valley on the south side of the Great Salt Lake, Lakeside Cave on the western shore, and at mound and beach sites in the Utah Valley near Provo, was of a generally crude, black pottery with coarse white temper and rims frequently decorated with incised lines or punctate decoration (Steward 1937*a*:42); the brunt of Steward's description, however, is from the Cave 1 assemblage. The difference between this, Fremont Ware, and Intermountain Ware has been a recurring theme in eastern Great Basin archaeology ever since (see discussion in Chapter 7). For the purposes of this study, references to Steward's Promontory Culture, and the Promontory people, are limited to the occupants of the Promontory Caves, and especially Cave 1, from which a detailed perishable record are known.

Numerous other sites with Promontory-affiliated ceramics have since been found, including several strata of Hogup Cave; the Bear River 1, 2, and 3 sites and the Knoll and Levee sites in the Bear River wetlands; Injun Creek on the east side of Willard Bay; the Salt Lake Airport site; and locales such as Heron Springs, Sandy Beach, and Goshen Island on the shores of Utah Lake (Aikens 1966, 1967*a*, 1967*b*, 1970, 1972; Allison 2002; Fry and Dalley 1979; Janetski and Smith 2007; Shields and Dalley 1978; G. Smith 2004). Promontory ceramics have also been noted in avocational collections (Stuart 2016). Analysts have relied on different aspects of Steward's type description, variably emphasizing and minimizing aspects of construction technique, vessel shape, thickness, surface treatment, temper, and decoration to find commonalities with or differences from Fremont types. Reanalysis of some collections has meanwhile resulted in numerous, often conflicting descriptions of just what Promontory pottery is, and by extension who the Promontory people were. Opinions can be divided into two general themes: one view, informed principally by collections from the Bear River wetlands, is that Promontory ceramics, while subtly different from most Fremont types, are not outside the known range of Fremont variability, despite what appears to be some Northern Plains influences; here, the pottery is termed Promontory Gray (Aikens 1966, 1967*b*, 1972; Dean 1992; D. Madsen 1979*b*; R. Madsen 1977). The other view, informed principally by collections from Utah Valley sites that postdate and are usually situated in different locales from Fremont occupations, is that Promontory ceramics were made in such a different way from Fremont ceramics that they constitute a distinct tradition of separate origin; here, the ceramics are termed Promontory Ware (Forsyth 1986; Janetski 1994; Janetski and Smith 2007; Smith 2004), a diagnostic indicator of the post-Formative peoples Janetski (1994) has termed the *Promontory Phase*. The enigmatic Promontory ceramics are essential to the identification of a Promontory affiliation at most sites in the eastern Great Basin, where perishable items are not preserved. The term Promontory Phase is applied in this study to the broader geographic and temporal distribution of sites in the eastern Great Basin where Promontory ceramics are known, inclusive of the Promontory Caves, but with the relationship between Steward's Promontory Culture being a subject of continued inquiry (Chapter 7).

There is some evidence of differential availability of lithic raw materials at Promontory Phase sites from Fremont ones. A comprehensive comparison of Fremont and Promontory lithic utilization has yet to be undertaken; previous studies have focused on obsidian (Janetski 1994, 2002; McDonald 1994), for which non-destructive energy dispersive x-ray fluorescence allows very specific source information to be obtained (Hughes 1998, 2010). Janetski (1994, 2002) has shown that at Fremont sites in Utah Valley, obsidian was principally obtained from the Topaz, Mineral Mountain, and Black Rock sources south of the Great Salt Lake. This changed in the post-Formative era: Promontory Phase sites in the Utah Valley demonstrate a predominant emphasis on northern sources, especially from the Malad source area in southeastern Idaho, with small amounts of Browns Bench obsidian from a source area overlooking the Snake River Plain and straddling the Utah, Nevada, and Idaho borders (Janetski 1994:172-73; 2002:356). This later utilization pattern reflects that seen at the Promontory Caves: there, geochemical analysis of 34 obsidian artifacts sourced all of them to locations north or northwest of the Great Salt Lake, with 80% of the sample (n = 27) coming from the Malad obsidian source 80 km to the north and the remainder from Browns Bench (Ives 2013).

The reasons for reliance on any particular obsidian source are open to speculation, but can probably be distilled down to the geographic ranges of individuals and their trading partners, whereby obsidian source utilization reflects the social networks community members participated in (Janetski 2002; McDonald 1994; M. Metcalf and McDonald 2012:179). In the case of the Promontory Caves, their inhabitants had socioeconomic connections or personal knowledge of and direct access to obsidian sources located almost exclusively to the north. It is doubtful that the pattern of obsidian utilization seen at the caves represents a *change* in socially mediated raw material utilization around the northern end of the Great Salt Lake, though. Obsidian from eastern Idaho sources was always important in the northeastern Great Basin (Holmer 1997:194).

Great Salt Lake Fremont sites in the Bear River wetlands—Levee, Knoll, and Bear River 1, 2, and 3, at which obsidian comprised 45.4% to 78.2% of lithic assemblages—have shown an exclusive reliance on Malad obsidian (Janetski 2002:355; McDonald 1994). These findings are drawn from limited samples, however. It remains to be determined whether the later Utah Valley assemblages represent the spread of a distinctly "Promontory" lithic utilization pattern or of participation in social networks established by the northernmost Great Salt Lake Fremont.

In addition to at least region-specific changes in raw material utilization, a significant replacement in projectile point styles began about AD 1150 as Desert Side-notched points became the dominant, and eventually sole projectile point type in the northern and western periphery of the Fremont area. A survey of Fremont-attributed sites and components in Box Elder County, where Promontory Point and the Bear River wetland sites are located, found that Desert Side-notched points make up 19% of the total projectile point assemblage (Reed et al. 2005:271-72). These may be indicative of post-Fremont use of some of these sites by Promontory Phase peoples (Janetski 1994, in prep.). Several authors have also noted both their similarity to side-notched points on the northern Plains and their association with Intermountain Ware and Numic occupations in the Protohistoric period (D. Fowler et al. 1973; Frison 1971; Holmer 1986; Holmer and Weder 1980:60). Given the lack of variability in projectile point styles over an enormous geographic area throughout the Late Prehistoric, the Desert Side-notched point type may be better regarded as a temporal horizon marker rather than a cultural diagnostic.

Another aspect of non-perishable Promontory material culture, as defined by Steward and based on finds at Promontory Caves 1 (n =4) and 3 (n = 3), is an assortment of etched stones, usually slate or limestone tablets, but sometimes also pebbles with "scratched geometric designs...

so faint as almost to escape detection… formed almost entirely of straight lines, bands, triangles, and chevrons filled with finer parallel lines or crosshatching" (Steward 1937*a*:77). Steward reported similar finds from amateur collections near Little Mountain, associated with Promontory-style ceramics at Lakeside Cave, and from caves near Blue Creek at the north end of Promontory Point. He was incorrect to argue they have no correlation with the modern Numic-speaking peoples of the region (Steward 1937*a*:86): as noted earlier, an incised stone tradition existed in the Great Basin as early as the Archaic period (James 1983:249-50; Jennings 1980; T. Thomas 1983*a*, 1983*b*), while historic examples are known from Shoshonean groups in the Central Great Basin from as recently as the 18th, 19th, and even 20th centuries, used as prayerstones that were interred at places of supernatural power (D. Thomas 2017, personal communication 2018).

That said, some of the Promontory incised stones feature decorative motifs that are distinct from other incised stone traditions, both of the Fremont area and the Central Great Basin. Anthropomorphic horned figures on one stone from Cave 3 (Steward 1937*a*: fig. 33, *d*) and several from the backs of caves near Blue Creek Station (Steward 1937*a*:78, fig. 34 *d*, *e*, *f*, and *h*) bear some resemblance to figures in Fremont pictographs with horns and more elaborate headdresses, including two at the back of Cave 1 (P. Schaafsma 1971; Steward 1937*a*:fig. 37). Though only heads would be represented, a similar horned motif may be present on two of the stones from Cave 1 (Steward 1937*a*: fig. 33, *f* and *g*). "Feathered headdress" motifs on similarly stylized anthropomorphic figures have also been found painted on bison and elk scapula and rib fragments from another cave in Boothe Valley, on the east side of Promontory Point, two of them enclosed in leather sheaths (M. Stuart 1988).

Their occurrence on irregularly shaped, flat-faced tablets is also distinctive, at least in the Great Salt Lake area, as is what appears to have been a transferability of motifs between stones and bone. Both the incised stones and painted bones from the Promontory area differ from the figurine-like incised stones seen at sites in the Bear River wetlands. They lack a morphology suggestive of handle termini, while instead of parts of the rock itself being shaped to represent a clearly delineated head, shoulders, and facial features, full or partial anthropomorphic features are instead depicted within the space of the rock surface as a canvas-like support medium. The non-anthropomorphic Promontory specimens (Steward 1937*a*:fig. 33*a*, *b*, *c*, *e* and fig. 34*b*, *c*, and *g*) show greater alignment with a Central Great Basin incised rock tradition: geometric shapes such as banded lines with crosshatching appear at Hogup Cave, though usually on rounded pebbles instead of slate or limestone tablets (Aikens 1970; Ottenhoff 2015:figs. 1.4, 8.8, 9.1).

Steward's incised stones "were found scattered in the rubbish on the cave floors" (1937*a*:77); two more were found in Promontory-aged strata in Cave 2 (Joel Janetski, pers. comm. 2018). An ethnographically attested practice of depositing incised stones in various locations elsewhere in the Great Basin leaves their attribution to the Promontory people a somewhat tenuous proposition. The caves were well known to the Neme (Northern Shoshone), and it cannot be ruled out that they were made and buried in the cave fill by visitors long after the Promontory people had abandoned them. But the practice of depositing effigy-like figures in inhabited or previously occupied caves is also reflected in the placement of some Fremont ceramic figurines (Morss 1954) and of the painted bones from Boothe Valley, found by an amateur collector as a single cache buried in the fill at the back of a cave (M. Stuart 1988). There is also a class of Diné curative ceremonies of note in this regard, collectively referred to as remaking rites, at the end of which small, simply carved anthropomorphic wooden figurines are interred upon ruins or other places where supernatural beings are believed to be able to access them (Franciscan Fathers 1910; Gill 1974; Haile 1947; James and Bradford 1974; Kelly 1972; Lang and Walters 1972; Spain 1982). Diné manufacture of clay anthropomorphic figurines is also known (Fewkes 1923; Haile 1947; Kluckhohn 1962; Morss 1954; Steen 1961; Strahan 1978; Tschopik 1941).

It would seem fair to observe that the makers of the Promontory incised stones were knowledgeable of an iconographic tradition shared by peoples on either side of the Great Salt Lake, and which in turn traces its earlier roots to the Great Basin Archaic. They also appear to have interpreted this tradition for themselves by fashioning their own variation that included depictions of horned anthropomorphs but veered away from shaping the support medium itself or selecting stones that conformed to a preconceived ideal shape. Some flexibility also appears evident in the raw material on, and method by which the iconographic depictions could be made.

The best-preserved deposits of the Promontory Phase, being from a cave setting, offer little insight into what Promontory residential structures looked like. The focus of people at the caves on big game hunting and their suggested migratory origins and ties to the Plains (Aikens 1966, 1967*b*; Steward 1937*a*) should bring expectations of heightened residential mobility. While this might possibly extend to portable hide-covered tipis transported by dog and travois, evidence for such, including stone-lined tipi rings, is currently lacking. Promontory-type ceramics and a preponderance of Desert Side-notched points found in association with late-dating square pit house structures with entrance tunnels at the Levee and Knoll sites probably represent the latest occurrences of the Fremont complex in the Great Basin and may be indicative of Promontory–

Fremont interaction (Aikens 1966:14, 74; dates for these structures are listed in Table 1.3) rather than the residences of the Promontory people themselves.

Some evidence for increasing residential mobility comes from the Orbit Inn site, just northeast of the Bear River wetlands, originally reported as dating between A.D. 1450–1500 (Simms and Heath 1990; but see Table 1.3). There, habitation structures were indicated by circular arrangements of postholes coupled with sediment compaction and coloration, as well as the distribution of refuse materials; absent were any semblance of semi-subterranean construction and fire-hardened adobe elements. "These characteristics suggest the presence of small (2.75–3.5 m diameter), pole and brush windbreaks, or brush-covered huts supported by a circular arrangement of poles" (Simms and Heath 1990:802). These structures were understandably difficult to identify and differ little from temporary camps in the Great Salt Lake wetlands and southwest of the lake (i.e., D. Madsen and Schmitt 2005; Simms 1986), leading Simms and Heath (1990) to attribute Orbit Inn to Fremont foragers of the Late Prehistoric period who had undergone a change in settlement pattern. They had also undergone a change in ceramic manufacture: calcite was the predominant temper type of the Orbit Inn ceramics, with "dice-sized chunks of calcite" and "tiny subangular 'grindings'" from screen and microrefuse samples demonstrating on-site manufacture, although the calcite itself was not available locally (Simms and Heath 1990:806). The dates for the Orbit Inn site correspond with those of the Promontory Phase in Utah Valley, where little is known about residential structures. As at Orbit Inn, "they were likely brush wickiups" (Janetski and Smith 2007:338).

Groundstone artifacts offer some intriguing possibilities for comparing Fremont and Promontory subsistence strategies. Grinding tools are essential in the preparation of flour made from corn and, in the post-horticultural era, from wild seeds. Aside from a small selection of groundstone mullers, or manos, Steward (1937*a*:79-80) found the absence of groundstone artifacts such as mortars, pestles, and metates to be quite conspicuous at the Promontory Caves. Fawcett and Simms (1993:25) countered this with their assertion of virtually no change in groundstone use at Late Prehistoric sites in the Great Salt Lake wetlands, noting:

> grinding stones… continue to abound with no detectable differences from the Fremont except for the absence of the Utah-type metate (which are not frequent in the wetlands, but tend to be found at Fremont farming bases near the edge of the wetlands or on the alluvial fans).

Grant Smith (2004:142), however, did observe one important change in groundstone use, noting "much fire-cracked rock (possibly a by-product of stone boiling) was recovered from Late Prehistoric sites in Utah Valley. A large number of these were recycled groundstone artifacts." A similar pattern of groundstone reuse and discard may be surmised at Orbit Inn, where 203 objects classified as grinding stones were recovered; only four of these were found intact, while the vast majority were found as fragments in midden areas (Simms and Heath 1990:802). Thus while still appearing in the artifact inventories of Promontory-affiliated sites, the context of groundstone use may have altered radically in the post-Fremont era.

Another aspect of the Promontory Phase that is virtually unknown is mortuary practices. At Great Salt Lake Fremont sites, people routinely buried their dead in the floors of residential structures or in refuse pits within settlement areas or, at wetlands sites, in oval pits at the margins of residential areas (Simms et al. 1991:26, 45). At Caldwell Village, a late Uinta Fremont site (ca. 900–750 BP), three pit houses contained sub-floor burials, and each appears to have been cleared of its contents and then deliberately burned, with the death marking the end of the use of a given structure (Ambler 1966:26–30). It is unclear whether Great Salt Lake Fremont also burned their structures after interment, but the proximity of burials to living spaces and continued residence near burials suggest a certain comfort with and even attachment to the dead.

These practices stand in stark contrast to both Numic and Dene mortuary customs. Neme, Newe, and Nuche burial practices involved placing burials well away from residential sites, usually in rock crevices or caves in remote upland locations or, more rarely, in ravines, and covering the body with rocks and dirt or constructing a timber-roofed grave that was in turn buried (Nickens 1984; A. Smith 1974:150; Steward 1943:343; Stewart 1942*a*:312). Dene eschatology can meanwhile be characterized by a perception of the spirits of the dead as evil and dangerous, especially to living relatives; great efforts were thus made to avoid them (Perry 1983:725–26). Among numerous Ndee groups including the Kiowa Apache, upon the death of an adult community member, the body was transported, if possible, through a new exit cut in the back of a hogan or lodge while the old entrance was closed up. If possible, the body was then removed to a remote upland location and placed in a shallow rocky crevice; great care was taken to avoid placing the body too near an arroyo or stream for fear of it washing out. Every effort was made to prevent being followed by the spirit of the deceased: individuals changed clothes and self-fumigated with ceremonial smoke, the objects owned by the deceased were gathered up and destroyed along with the individual's residence structure, and the camp where the death occurred was completely abandoned (Goodwin 1942; Opler 1941:475, 1945, 1965:422; Opler and Bittle 1961). Similar patterns were practiced by numerous Northern and Pacific Coast Dene (Heizer 1978:197; Honigmann 1946, 1954:141; Jenness 1937:39; McKennan 1959; Osgood 1937:168; Van Stone

1974:54), and by the Diné, although social recruitment from other groups in recent centuries also led to their inclusion of interments in timber-roofed burials or, resembling Uinta Fremont practice, in residence structures that were subsequently burned (Brugge 1978:313–14; Young 1961:530; cf. Ambler 1966:26–30). Aversion to the dead should be considered a useful marker of ethnic identity when proximity of residence to burials stands so out of alignment with what should be anticipated of both Numic and Proto-Southern Dene occupations.

Subsistence

Without question, the Promontory people were hunters, exploiting a range of bison and smaller artiodactyls such as mule deer and antelope, as well as smaller species including porcupine, various lagomorphs, and birds (Steward 1937*a*:81–82; Johansson 2013). Attention must be given, however, to the scale of the Promontory bison hunting industry, which was truly unprecedented in the Great Basin. At nearby Hogup Cave, on the opposite side of Gunnison Bay, Aikens (1970:190–95) calculated that bison would have dominated the diet based on a total harvest, over a 10,000-year period, of 22 individual animals. A greater number of bison (MNI = 25) has been counted from one 20-cm thick hearth-cleaning feature at Cave 1 alone, likely representing a single kill event (Johansson 2014; see Chapter 6). The small part of this feature intersected in excavation is but a fraction of the more than 2 m of Promontory Culture deposits at Promontory Cave 1.[16]

It is common for faunal remains to be pulverized and burned beyond recognition at archaeological sites and for species identification to be based on a small portion of partly intact, identifiable fragments (referred to as number of identifiable specimens, or NISP). A certain degree of misapprehension about the scale of hunting at the caves is understandable from previous reports, given that Steward made no effort to collect the burnt and pulverized scraps of animal bone he encountered (Johansson 2013; Steward 1937*a*:10). Thus the numbers that can be gleaned from his study (bison NISP = 45, Steward 1937*a*; NISP = 20, Lupo and Schmitt 1997, Grayson 2006) are, as an indication of overall hunting intensity, severely undervalued. But whereas identifiable bison made up a mere 0.003% of NISP at Danger Cave (11 of 3,153 specimens; Grayson 1988; Jennings 1957), a screened sample from the uppermost 30 cm of a 2 m^2 test area excavated in 2011 yielded 8,862 identifiable and unidentifiable bone specimens, of which 2.7% (NISP = 243) were bison (Johansson 2013:38–41); in the hearth-cleaning feature exposed deeper in the same test area, bison comprised 36% of NISP (Johansson 2014).

While some rabbit and hare (1.0% of NISP), mule deer (0.5% of NISP), pronghorn (0.4% of NISP), and mountain sheep (0.2% of NISP) have also been found in Cave 1 (Johansson 2013, calculated from 2011 excavation sample), to call this big game hunting would obscure rather than elucidate: the contribution of other game to the Promontory people's diet was minuscule compared to that of bison. Nor were the Promontory people foragers: indeed, while edible seeds are abundant in both Cave 1 and 2, evidence of their being processed for consumption, for instance through charring or parching, is exceedingly scant; flora instead appear to have been harvested primarily for utilitarian purposes such as mat-weaving and bedding (Rhode 2017, In prep.). The groundstone implements for processing seeds, discussed below, are similarly lacking.

Total MNIs for the 2011–2014 excavations at Cave 1 have not yet been counted, and none can be calculated for the incomplete sample retained by Steward, but following Aikens's (1970) calculations for dressed meat weight, the 25 individuals seen in the hearth-cleaning feature alone would yield 10,205 kg of meat. This is a staggering figure when compared to the 16,463.4 kg total yield from all species in the entire 10,000-year history of Hogup Cave (Aikens 1970:195; Table 2.1), and yet it represents but a single event. Even if that level of hunting intensity took place only once in what appears to have been a 50-year period of occupation by Promontory Culture peoples (Ives et al. 2014; see discussion of chronology below), Aikens's hunting intensity index (kg/ka) yields a score of 204,100, dwarfing the yield from opportunistic hunting in the Formative period deposits at Hogup Cave (indexed score of 4,351.6; Table 2.1).

The number of bison taken by the Promontory people was undoubtedly much higher than the single hearth-cleaning feature would suggest. Using 3D modeling, Jen Hallson (2017:86) has extrapolated the number of faunal remains from the excavated portions of Cave 1 over the remaining unexcavated portions, estimating a total faunal assemblage of between 1.54 and 1.74 million specimens in Cave 1, of which, applying the proportions reported by Johansson (2013), approximately 40,500–46,980 should be expected to be identifiable as bison. Aileen Reilly (2015:103) has calculated that to manufacture the 340 moccasins that have so far been recovered from the caves, 24.5–58.3 bison hides would have been required. Those hides are a reliable substitute for bone elements in determining the number of bison taken by Promontory hunters, but they still account for only that minority of the cave area that has presently been excavated. Using the same extrapolation calculations as for the faunal assemblage Hallson (2017:86) has estimated that the caves may hold a conservative estimate of between 2,244 and 2,537 moccasins. Applying the calculation by Reilly (2015) to these updated moccasin numbers, 807.8–913.3 m^2 of leather would be required, or an MNI of 162–435 bison, depending on whether small or large hides were used (Hallson 2017:118).

Even before extrapolation, the yields suggest that the Promontory people were not just hunters operating as individuals to target available game on an opportunistic basis, but hunters with expertise in coordinating groups of people to produce significant kill events. This pattern is not repeated at all sites attributed to the Promontory Phase, however. In Utah Valley, open-air Promontory Phase sites found in lake lowlands and marsh edges represent people with a wetlands-adapted lifestyle focused on fish, muskrat, and birds, with only occasional capture of larger ungulates, while bison remains, when found at all, are exceedingly rare (Allison 2002; Cannon and Creer 2011; Janetski and Smith 2007; Johansson 2013; Lupo and Schmitt 1997). The contrast in lifestyles is further accentuated by differences in plant harvesting: at the wetlands sites in Utah Valley, charred seeds of plant foods are routinely observed (Janetski and Smith 2007).

The interpretation offered by Don Forsyth (1986) that Promontory people were broad-spectrum foragers who spent part of their time seasonally hunting bison is probably incorrect. Storage pits and well developed middens at lake-edge sites in the Utah Valley wetlands have been interpreted to represent relatively stable, year-round settlements (Allison 2002; Cannon and Creer 2011; Janetski and Smith 2007), and little evidence can be found to suggest the Promontory people participated in such a lifestyle. The full significance of the discrepancy between subsistence patterns at the Promontory Caves and in Utah Valley is not evident, however, without a close appraisal of the chronology that is emerging in large part from recent work on Promontory Point.

Dating the Promontory Phase: Early and late periods

While Julian Steward always pointed to evidence at Cave 1 for cross-cultural interaction between intrusive bison hunters and Fremont (then termed puebloan) peoples, his work was conducted prior to the advent of radiometric dating. He could therefore provide no greater resolution than that the caves were occupied in a space between the abandonment of maize horticulture and the onset of European colonization. While he suggested a possible window of occupation between about one thousand years ago and one hundred years before present, adding that "[i]t is possible, though unlikely, that the Promontory people occupied the cave during this entire time" (Steward 1937*a*:83), it is clear that he leaned towards the earlier end of this spectrum.

Until quite recently, the timing of the Promontory people's occupation of the Promontory Caves was only poorly known. As dates have been obtained, first from museum collections and related sites beginning in the 1960s, then from materials newly excavated since 2011 (Ives et al. 2014:629; additional dates reported in Yanicki and Ives 2017), significant gains have been made in understanding not only the timing of the Promontory phenomenon, but the relationship between Promontory and earlier and later periods. Because with each new set of dates, a number of corollary interpretations were made by previous researchers that were in part dependent on the best available knowledge, a summary of past interpretations is presented here that reflects the gradually increasing refinements to the chronology.

Melvin Aikens was the first to directly date material from the Promontory Caves, obtaining two conventional ^{14}C dates from Cave 1 moccasins. One unprovenienced leather sample yielded a date of AD 1110 ± 75 (cal. yr. AD 1034-1284; Aikens 1966), while the second, unpublished by Aikens, who felt it was "too late" (Marwitt 1970:144), was calibrated to much later, AD 1432-1680. Sites around the northern Great Salt Lake excavated by Aikens, including Hogup Cave, Injun Creek, and Bear River 1 and 2, yielded mixed ceramic assemblages including many specimens he felt resembled the Promontory type. By not distinguishing Promontory from Fremont, Aikens arrived at the conclusion that the entirety of the Fremont Culture, as it was then still known, originated on the northern Plains and eventually returned there after the abandonment of horticulture (Aikens 1966, 1967*b*, 1970:32). In response to early criticism (notably from Husted and Mallory 1967; W. Wedel 1967), Aikens (1972) soon revised his claim, acknowledging regional variability within Fremont and mounting evidence for early influence from geographically contiguous, horticulturalist Ancestral Puebloan branches in southern Utah. Thus, he concluded, it was only the most northerly Fremont variants, from the Great Salt Lake and Uinta Basin, who might have been subject to "external influences," including Subarctic Dene ones, originating in the far north and the Plains (Aikens 1972:63–64).

Aikens's later conclusions about influences from external groups on resident populations in the terminal Fremont period and population movements between the Great Basin and the Plains bear repeating, as these relatively nuanced claims differ little in principle, if not in substance, from what is investigated here. A great deal of confusion arose, however, from his conflation of Promontory and Fremont material culture at sites with mixed assemblages, particularly based on ceramic evidence. Looking exclusively at the material from the Promontory Caves, Steward (1937*a*) made no equivocation between them: quite conversely, he found that Promontory and Fremont assemblages were distinct and that Fremont ceramics were generally absent at Promontory sites. This finding differs considerably from the Bear River wetlands sites and Hogup Cave, where Promontory ceramics occur only as a minority of assemblages, and possibly even more rarely than Aikens suspected, depending on how ceramic typologies are interpreted (cf. Forsyth 1986; D. Madsen 1979*a*; see Chapter 7). While aspects of these sites raise the possibility of contemporaneity between the makers of Great Salt Lake Fremont and

Promontory ceramics, classifying them as the product of a single archaeological culture oversimplifies what were likely more complex intersocietal dynamics.

The Promontory affiliated assemblages that have been identified along the Wasatch Front from the Bear River to the Utah Valley—that is, Janetski's Promontory Phase—seem in accord with Steward's view, mostly occurring between ca. AD 1300–1600 (Allison 2002; Cannon and Creer 2011; Forsyth 1986:190; Janetski 1986, 1990, 1994:176; Janetski and Smith 2007; Simms and Heath 1990; G. Smith 2004), and averaging in the late 1400s (Janetski, In prep.). With the exception of single outlying dates from Heron Springs, 42DV2, and Goshen Island South, decades or even centuries separate the Promontory Phase from what is generally agreed to be the Fremont era in the northern Great Basin (summarized by Johansson 2013:14; G. Smith 2004:63). The Promontory label for this time period stems primarily from a broad similarity between ceramics at sites on the Utah Lake observed by Steward and those found at the Promontory Caves, with additional reference to projectile points—especially Desert Side-notched and Cottonwood Triangular—and other chipped stone tools, including steep-edged scrapers and Shoshone knives (Janetski, In prep.; Janetski and Smith 2007). Differences in subsistence between the caves and open-air sites has already been noted, though, and as only open-air sites with poor preservation are known, they also universally lack any of the distinctive perishable items, especially moccasins, on which Steward's classification of the Promontory Culture was based.

The picture of the association between Steward's Promontory Culture and Janetski's Promontory Phase has continued to develop since 2004 as a growing number of high-resolution accelerator mass spectrometry (AMS) radiocarbon dates for specimens from Cave 1 have been published. These include organic residue on a Promontory ware sherd from Steward's collections at the NHMU reported by Grant Smith (2004) and dates from three Promontory moccasins (Kankainen 2005, cited in Janetski and Smith 2007). More recently, Ives et al. (2014) reported 43 AMS dates from moccasins and other perishable items from Cave 1, two specimens from Cave 2, and two previously unreported ceramic residue dates (Ives et al. 2014:628–629); dates have now been obtained for 95 items from Cave 1 (Yanicki and Ives 2017).

Of these, the pot residue has proved to be problematic, yielding both an early date of 610 ± 40 ^{14}C yr. BP (cal. yr. AD 1290–1409) and two later dates, 360 ± 40 and 330 ± 4o ^{14}C yr. BP (cal. yr. 1450–1636 and 1466–1645). The former is comparable to the early date published by Aikens (1966), while the latter two echo late date reported by Marwitt (1970) and the latest known dates for the Promontory Phase along the Wasatch Front. All three, however, are decades or even centuries younger than all but one of the other dated specimens, indicating a systemic skew to the residue dates that has yet to be fully understood; the sole outlying late date comes from a diagonally twined, S-twist winnowing basket fragment dated 165 ± 25 ^{14}C yr BP, related to a Protohistoric Shoshonean occupation (Ives et al. 2014:630).

The overwhelming majority of the Cave 1 and Cave 2 materials have been dated to between 662-886 ^{14}C yr BP (median calendric dates for this range extend from AD 1220–1321). Bayesian modeling of these dates—a statistical method that incorporates prior knowledge, including stratigraphic data and other dates, to constrain the uncertainty in probabilistic date ranges (Bronk Ramsey 2009, 2013)—suggests peak occupation most likely occurred between AD 1247-1291. This date range only describes material from the Promontory-bearing strata; older occupations in both caves—common in Cave 2 but unexpectedly scarce in Cave 1—have also been identified.

The pre-AD 1300 onset, florescence, and cessation of Steward's Promontory Culture, at least as represented at the Promontory Caves, falls entirely within the time range of Fremont occupation of the Great Salt Lake area; the relationship between the caves' occupants and the Great Salt Lake Fremont must be reappraised. At the very least, the eastern Great Basin was not empty at the time of the Promontory people's arrival. Contemporaneous occupation invites speculation about the "external influences" that Aikens (1972) had suspected, and the possibility not simply of unilateral influence from a Plains-based society on a residential Fremont population, but "the possibility of influence from one group to another" (G. Smith 2004:32).

These dates also demonstrate how occupations at the Promontory Caves and in Utah Valley are not strictly equivalent. Despite the broad similarities in non-perishable material culture that have allowed the Promontory Phase to be defined, the former are terminal Fremont-contemporary while the latter are post-Fremont. On the basis of subsistence differences, Lindsay Johansson (2013:122) has offered that Promontory occupations can be differently characterized based on early (Promontory Caves, pre-AD 1300) and late (Wasatch Front and Utah Valley, ca. AD 1300-1600) manifestations. Adding differences in residential settlement patterns and material culture that are becoming increasingly clear (see discussion of early vs. late Promontory ceramics in Chapter 7), Janetski (In prep.) has proposed that these be termed the Early and Late Promontory Phase.

This classification scheme recognizes a synchronous Early Promontory and terminal Fremont (i.e., Levee Phase) presence in the northern Great Salt Lake area in the 13th century. The full nature of the relationship between both and the Late Promontory Phase remains unclear. The shift from big game hunting at the Promontory Caves to a sedentary, wetlands-based foraging and fishing lifestyle less than a century later requires additional exploration. In many respects the Late Promontory pattern resembles life in the Bear River wetlands rather than at the caves and other uplands sites (Steward 1937*a*; Stuart 2016). Were changes among the wetlands-adapted peoples from the Great Salt Lake area, then, part of the same phenomenon, with both arriving at a common outcome? Also unresolved are relationships to the Numic peoples on the Great Salt Lake's doorstep, and questions of when their Protohistoric expansion got underway.

Promontory and Fremont ties beyond the Great Basin

If, as the limited chronometric evidence suggests, the Bear River wetland sites were among the last vestiges of the Great Salt Lake Fremont, it would appear that for a time, the fates of the Promontory and the northernmost Fremont peoples were intertwined. It is possible that some of these individuals or groups became integrated with the Numa spreading across the eastern Great Basin and northern Colorado Plateau. Indeed, Numic-speaking peoples west of the Great Salt Lake and into the central Great Basin may well have participated in the farmer-forager dynamics that characterized life along the northwestern frontier of maize horticulture for many centuries. It is doubtful, however, that this occurred on a sufficiently large scale to account for the full scope of cultural changes in the post-Formative era. As has already been discussed, the greater bulk of evidence points to significant discontinuities between the Numa and earlier archaeologically known complexes.

In marshaling evidence of changes in material culture and accompanying residential and subsistence strategies from the Late Prehistoric transition and beyond, authors such as Aikens (1966, 1967*b*) and James Gunnerson (1956, 1960) postulated that, as an alternative to cultural replacement, migration was a significant factor in the post-horticulturalist era as Fremont-affiliated peoples exited the Great Basin. In this scenario, which draws heavily from observations of a big game hunting focus in the Bear River wetlands and at the Promontory Caves, bison provided the critical pull. The suggestion is not without merit: especially to the north, on the Snake River Plain, and east on the Great Plains, tantalizing clues exist about the persistence of both Fremont- and Promontory-like craft production centuries after these traditions are last noted in the Great Salt Lake area. More broadly, some Fremont groups may also have looked southward, eventually integrating with remnant Ancestral Puebloan groups that underwent similar sociodemographic upheaval in the mid-13th century.

Eastern Idaho sites

Based primarily on ceramic evidence from a number of sites in eastern Idaho, Robert Butler (1981, 1983) proposed a northward movement of Fremont peoples from the Great Salt Lake area during the time period from AD 1350-1650. Although the pottery he examined was highly variable, especially deviating from published type descriptions in terms of the raw materials of paste or temper (likely attributable to their local manufacture), Butler enlisted the aid of noted Fremont ceramicists such as Rex Madsen and David Madsen to identify both Great Salt Lake Gray and Promontory Gray at a number of sites with a distribution on the Snake River Plain or tributary valleys in what is now eastern and south-central Idaho (Butler 1986:43–48).

At Wilson Butte Cave, a site northeast of Twin Falls, Idaho, on the Snake River Plain, pottery fragments classified as Great Salt Lake Gray were recovered from strata yielding dates of 425 ± 150 BP and 365 ± 80 BP (Butler 1981:2-3, 1983:6-8, 1986; Gruhn 1999, 2006). The former date is somewhat problematic, with a calibrated range that most likely falls between AD 1271 and 1696 (85.6% probability, but with other potential intercepts into the 20th century). The latter date is less ambiguous, with a 94.5% probability of falling within a range of 1417–1666 cal. yr. AD—overlapping the range of the other date but starting later and ending earlier. These "suggest that the northern variant of Fremont culture, the Great Salt Lake, may have persisted in southern Idaho for two centuries or more after its presumed demise in northern Utah, about AD 1300-1350" (Butler 1983:8).

A dissenting opinion has been offered by Mark Plew (1979, 1980, 1981, 2008), who contends that based on differences in temper, the Idahoan manifestations of Great Salt Lake Gray are in fact a local variant, Southern Idaho Plain, which was adapted by local Shoshonean peoples. Plew's identification effectively mirrors Ruth Gruhn's (1961*a*) original identification of these specimens as being of Shoshonean origin. Gruhn, however, has since reconsidered this position (Gruhn 1999, 2006), in part because the Wilson Butte specimens do not exhibit the flower pot-shaped or conical vessel forms known of other Shoshonean wares (cf. Butler 1983; Tuohy 1973, 1986, 1990, etc.). The morphological difference is significant, as the same ceramic sequence as seen in the Great Salt Lake area is mirrored on the Snake River Plain, with forms more typical of Intermountain Ware appearing after Fremont and Promontory specimens in the 16th–18th centuries (Butler 1986:fig. 18).

Mingling of Promontory ware and Great Salt Lake Gray in archaeological sites and individual components is noted throughout southeastern Idaho, for instance at 10OA275, where both types are found on living floors and in fill deposits (Arkush 2012, 2014, In prep.), and in the uppermost layers of the Wasden site (Owl Cave), 18 km west of Idaho Falls (Butler 1986:48-49).

The mixing of Promontory and Fremont materials in this area also extends to other artifact types, such as Desert Side-notched projectile points at Owl Cave, dry-laid masonry at the Clover Creek site (Butler and Murphey 1982), and dice, which at Wilson Butte Cave included both a diagonally-incised cane die similar to the many split cane dice seen at Promontory Cave 1 (Gruhn 1961*a*:96), as well as 115 cut and polished, tabular bone dice more typical of Fremont sites (Bryan 2006:102-03; Cockle 2006; Gruhn 1961*a*). At Pence-Duerig Cave, near Dietrich, Idaho, similar rectangular bone dice were found together with "one small tabular piece of calcite" with "irregular flakes… removed from the sides [and] evidence of battering along one edge" (Gruhn 1961*b*:5). While unusual, the transport of calcite tablets is not entirely without precedent: at the Orbit Inn site, dice-sized chunks and tiny calcite grindings show this material was transported to and processed at the site, probably for the on-site production of calcite-tempered Promontory ware (Simms and Heath 1990:806).

The Dismal River aspect

Looking east of the Colorado Plateau and the Rocky Mountains, the Dismal River aspect, an archaeological complex of the Central and Southern Plains, has long been of interest both for possible Fremont and Promontory connections. James Gunnerson (1960:141) first drew attention to Dismal River as having an "alien base" overlaid with Plains characteristics. Noting similarities between Fremont and Dismal River in terms of a combined horticultural-hunting economy, pottery, and residential structures, Aikens (1966:83) proposed that Fremont groups migrating out of the eastern Great Basin and Colorado Plateau were responsible for the many aspects of the Dismal River tradition that were alien to the Plains. Though the combination of maize horticulture and big game hunting itself was not uncommon for Plains Village cultures, it was the Dismal River peoples' combination of that subsistence pattern with pottery and house structure styles for which no Plains antecedents were known that made their assemblages distinctive (J. Gunnerson 1956:71; W. Wedel 1964:213).

Aikens felt the timing of the Dismal River phenomenon as a descendant tradition worked well with evidence from the eastern Great Basin for the Fremont decline, with the then-earliest dated occurrences of Dismal River being dated to around AD 1650. Though this would leave a 300-year time gap between Dismal River and the terminal Fremont, his admittedly tentative dates from the Injun Creek site, ca. AD 1400–1600, could help account for the interval. Alternately, a period of occupation by Fremont-affiliated peoples in southern Wyoming or western Colorado would help account for the time difference, in support of which Aikens noted some limited evidence of Fremont ceramics associated with tipi rings in the Wyoming Basin (Aikens 1966:83; Sharrock 1966).

The suggested link to tipi rings is intriguing. Dismal River sites were originally characterized not by tipis, a highly mobile residential structure type, but by surface or shallowly subterranean structures with interior hearths, vertical interior support posts with crossbeams arranged across their tops, and leaning walls angled inward from the exterior surface level to the crossbeams and covered with grass, brush, and earth (Aikens 1966:84; J. Gunnerson 1960). The structure type is not dissimilar to the Great Salt Lake Fremont pit houses described at Willard by Judd (1926:6–7) or at Grantsville by Steward (1933), except that adobe lining is generally absent and instead of access through a hole in the roof, entrance tunnels appear to have been used—a feature present in structures at the Levee site (Fry and Dalley 1979:21). In their review of the distribution of western and eastern Dismal River variants, differentiated by ceramic types and other traits, Kevin Gilmore and Sean Larmore (2012:41, following Baugh and Eddy 1987; Brunswig 1995) have noted that sedentary earthlodges are more common to the eastern variant on the Central Plains of what is now Nebraska and Kansas. In the distributional range of the western variant in the Front Range of the Southern Rocky Mountains and the High Plains of Colorado and Wyoming, portable, temporary structures interpreted as the outlines of hide lodges, subsequently removed, are instead known. Peoples of a third, southern Dismal River variant in southern Colorado and northeastern New Mexico meanwhile did construct small adobe and masonry habitation structures (Gilmore and Larmore 2005, 2012:42; J. Gunnerson 1979; Tucker et al. 2005).

In terms of ceramics, comparison was initially drawn between Dismal River and Steward's Promontory specimens:

> The majority of Promontory potsherds are tempered with large pieces of limestone, in which respect they differ radically from Dismal River pottery. The remaining Promontory sherds, however, are tempered with fine quartz or sand, and in some cases mica is included. Many of these are well within the range of Dismal River pottery. The paste in the primarily sand-tempered Promontory sherds may be slightly more laminated than that of most Dismal River pottery, or than that of the coarser limestone-tempered Promontory pottery.
>
> The thickness of the 2 wares is about the same. Promontory pottery is usually black, although occasional sherds are brown, and many are encrusted with soot, traits also found in Dismal River. Decoration on the outside of vessels, although rare in both complexes, seems to be slightly more common on Promontory ware. Thickened lips, with incised and punctated

> decoration, which Steward found to be unique to Promontory ware in the Great Basin, are characteristic of Dismal River pottery also. Vessel shapes and sizes are similar; possibly Dismal River vessels have more pointed bottoms. Handles are lacking in both complexes. [J. Gunnerson 1956:69]

Aikens felt that the fine quartz, sand, and mica temper correlates were especially significant, noting that they are in fact common to Fremont pottery in general, of which he viewed Promontory to be a late variant. Thus, “Fremont influences contributed importantly to the development of the unique (for the Plains) Dismal River pottery” (Aikens 1966:84). With the exception of highly micaceous examples (some of which may be trade wares from the Puebloan area), however, the range of tempers present in Dismal River ceramics are not particularly unusual among other Plains and Rocky Mountain ceramics, reflecting both flexibility on the part of the pottery’s makers and the ubiquity of quartz, sand, and granites bearing small amounts of mica (D. Hill 2012:228–29; Trabert et al. 2016). Gunnerson’s observations about vessel form, and particularly the novelty of Promontory and Dismal River rimsherds, are more compelling but it should be noted that similar rim decoration to Promontory, albeit on tapered and squared rather than thickened rims, occurs rarely in Uinta Gray, the Fremont ceramic type from the northern Colorado Plateau (D. Madsen 1979*a*; Wormington 1955:69). The issue of Promontory or Fremont influences may be somewhat moot: given their timing long after the period during which Promontory and Fremont contact occurred, Dismal River ceramics could easily be seen as having been influenced by both. As a clearer understanding of the relationship between Fremont and Promontory peoples emerges, so too may an understanding of their influences on Dismal River pottery.

Today, Dismal River ceramics are classified as the Lovitt type-series—Lovitt Plain and Lovitt Simple-stamped—among the western and eastern variants, and Sangre de Cristo micaceous plainware with the southern variant (Brunswig 1995, 2012; J. Gunnerson 1968). It was the Lovitt types Gunnerson (1956) referred to in comparison to Promontory ware. The micaceous pottery of the southern Sangre de Cristo variant has meanwhile drawn attention as an early form in a temporal sequence that also includes the later Ocate Micaceous and Cimarron Micaceous types, which in turn compare favourably to respective Jicarilla and eastern Pueblo ceramics (Sunday Eiselt 2017, personal communication; J. Gunnerson 1979:167–68; Habicht-Mauche 1988, 1991; Trabert et al. 2016).

In part fuelled by speculation on connections to Proto-Southern Dene in the Rocky Mountains and on the Plains, understanding of the Dismal River aspect has continued to grow (Brunswig 2012; Gilmore and Larmore 2012; Trabert et al. 2016; etc.). For want of new data, though, little attention has been given to earlier arguments for origins in the Fremont and Promontory traditions (Brugge 2012:138; Gordon 2012:335). Returning for a moment to the matter of chronology, an area that has undergone significant refinement in recent decades, Gilmore and Larmore's (2005, 2012:46–47) syntheses of nine high-altitude (8,000–11,300 ft.) western Dismal River sites in Colorado's Front Range are enlightening. Tightly clustering within a calibrated range of AD 1300–1650, these sites occur squarely in the intermediary period, and in the intermediary geographic region, between late Fremont or Promontory and more easterly Dismal River occupations as Aikens (1966:83) predicted.

People at these sites made the Lovitt ceramic types that have drawn comparison to Promontory and Fremont wares. They also made side-and tri-notched projectile points, often with basal spurs, and unnotched, basally concave points (Gilmore 2005; Gilmore and Larmore 2005, 2012:48–49). These are comparable to and often indistinguishable from the Uinta and Bear River (side-notched), Desert Side-notched (tri-notched), and Cottonwood Triangular (unnotched) projectile point types that were made at sites of the Formative and Late Prehistoric periods in the Great Basin (Frison 1971; D. Fowler et al. 1973; Holmer 1986; Holmer and Weder 1980:60; Janetski 1994; Reed et al. 2005:271-73). Also of note in the Front Range assemblages are double-bitted bifaces considered diagnostic of Dismal River and which also are associated with suspected ancestral Ndee sites of the Cerro Rojo complex in New Mexico, where spurred and basally notched projectile points are also common (Gilmore and Larmore 2012:48; J. Gunnerson 1969*b*, 1979; Seymour 2004, 2012*b*:109–10). Perishable artifacts are rare, but at Franktown Cave, individual finds include a Promontory-style BSM B2 (Bb) moccasin with heel-tab and ankle wrap (Gilmore 2005; Ives et al. 2014:627) and a sinew-netted hoop from a hoop-and-dart game of similar manufacture to one found at Promontory Cave 1 (Gilmore 2005:6; Yanicki and Ives 2017; see discussion in Chapter 5). A picture from these finds emerges that links occupations in the Front Range and Central Plains to both later manifestations in the Southwest and to the Colorado Plateau and eastern Great Basin.

A research focus committed solely to the question of Dene migration could skew perceptions of Dismal River as having been a purely Proto-Ndee phenomenon—a conclusion that some authors have cautioned against (Gulley 2000; Opler 1983). A more reserved judgement, that Proto-Ndee peoples "were part of the Dismal River cultural pattern" (Gilmore and Larmore 2012:45), seems more likely to be accurate. While conforming to the expected geographic location and timing of Plains bison-hunting, presumably Ndee populations reported in 16th-century Spanish accounts from New Mexico (i.e., the Querecho and Teya; D. Gunnerson 1974; J. Gunnerson 1960; Hammond and Rey 1940), several conspicuous discrepancies with the Proto-Ndee narrative exist in terms of subsistence, with a reliance on horticulture, and mobility, with construction of semi-subterranean residences (Gilmore and Larmore 2012:45).

A recurring theme evident among Dene peoples in different geographic settings, be it the Interior Plateau of northern British Columbia, the California coast, the Southwest, or the Plains is a widespread readiness to adopt the physical trappings of neighbouring groups—a tendency which in locales where non-perishable items are not preserved may render a Dene presence archaeologically invisible (Ives 1990, 2003, 2017; Le Blanc 2009). Deni Seymour (2012*b*:106–07) has made a similar acknowledgement in terms of Southern Dene groups likely learning pottery from their neighbours, either en route to or upon arrival in their historic ranges: it remains an "open question whether ancestral Apacheans arrived with a single ceramic technology or whether they adopted it/them once in the Southwest" (Seymour 2012*b*:107). Thus, while "it is not outside the realm of possibility that one segment of the Proto-Apache population would have adopted horticulture and a semi-sedentary lifeway characterized by semi-subterranean structures" (Gilmore and Larmore 2012:45), such reasoning should lead us directly to the analytical problem of telling apart that which is Ndee from that which represents the parent tradition they adopted these traits from. That is, if a part of the Dismal River phenomenon represents Proto-Ndee who were adopting distinctive Dismal River traits like horticulture and earthlodges, that still leaves the question of who the Dismal River people were unanswered. These are the same challenges that have been and continue to be faced in discussions of Promontory and the Fremont in the Great Basin.

Discussion: Subsistence Changes in Culture-Historical Perspective

Neither Steward's Promontory Culture nor Janetski's Promontory Phase are universally accepted. Authors advocating a behaviouralist approach (D. Madsen and Simms 1998; Simms et al. 1997:779; Simms and Heath 1990) have argued that on the northeastern margins of the Great Salt Lake, Late Prehistoric sites such as Orbit Inn reflect widespread adaptive developments by Fremont farmers and foragers in response to climatic and ecological shifts at the end of the Formative period. Research interests focused on understanding issues of sedentism, craft specialization, and behavioural changes in response to environmental conditions in part reflect a desire to break away from what Phillip Arnold (1991:4) termed "the tyranny of culture history" and to focus on "broader anthropological issues of the day." One proposed adaptation arising from persistent droughts in the 12th century, for instance, would have been a more casual production of ceramics. The point is well taken: sedentary and semi-sedentary or nomadic groups would have had different functional requirements, an issue which relates to decisions about transporting or not transporting finished ceramic objects, investing time in producing high-quality goods or making disposable wares, and potentially even whether to produce pottery at all, especially in favour of lightweight, waterproof basketry that could serve a similar purpose (Eerkens 2003, 2008, 2011; Gibbs 2012; Gibbs and Jordan 2013; Skibo et al. 1989; Skibo et al. 2008; Sturm et al. 2016).

From this view, the descent of the Post-Formative peoples of the area need not be considered anything other than the same panoply collectively referred to as the Fremont Complex in the Formative period. Madsen and Simms rejected migration as having any explanatory power in relation to such behavioural adaptations: they deemed the notion of a migratory Promontory

Culture replacing the Fremont objectionable on the grounds that the variability seen in contemporaneous ceramics could "represent different uses of the same landscape by the same people" (D. Madsen and Simms 1998:318) as their circumstances changed, ostensibly from less to more mobile. Nor, on the same grounds, should ceramic change be viewed as cultural replacement. Thus, in regards to the Promontory Problem, they concluded:

> Behaviorally patterned variability in Fremont ceramics suggests that the less well-made forms of pottery often identified as "Promontory" were most likely produced by mobile foragers and that, with the disappearance of farming in the area, these foragers merely continued to operate in the same fashion and in largely the same ways that they had. [D. Madsen and Simms 1998:318]

A dismissal of the Promontory phenomenon as a continuation of foraging life in the Great Basin as it always had been is dissatisfying in the face of emerging evidence for the scale of bison procurement at Cave 1, which should be understood as a radical departure from previous subsistence patterns in the region. The people who made the perishable and non-perishable goods that Steward defined as representing the Promontory Culture, and who subsisted almost entirely off of bison with much lesser contributions from other large game, are known in this particular expression only from the Promontory Caves. Although Grayson (2006) and Lupo and Schmitt (1997) have suggested that bison hunting was common among Fremont peoples, no Formative period site in the eastern Great Basin presents a similar intensity to that seen at the Promontory Caves. Table 2.2 shows how this trend towards very low bison utilization manifests at sites around Great Salt Lake and Utah Lake. As noted by Lupo and Schmitt (1997), it is difficult to compare sites objectively without accounting for differences in excavation areas, volumes, and methods, or

Table 2.2. Frequency of bison from Formative and Late Prehistoric sites in the Great Salt Lake area, including Utah Valley (adapted from Grayson 2006 with updated data from Promontory Caves 1 and 2 and additional sites referenced by Johansson 2013, 2014).

Site	Analytical unit	Sampled Area	NISP (MNI)	Date Range (^{14}C yr BP)[a]	References
42BO1 (Cave 1)	Stratum E3 Stratum E1 Entire cave	~2 m^2 ~0.4 m^2 449 m^2	243 (n/a) 2,355 (25) 40,500–46,980 (162–435)[c]	886–662[b] 755–760 886–662[b]	Hallson 2017:86; Johansson 2013, 2014; Reilly 2015:101–103; Yanicki and Ives 2017
42BO2 (Cave 2)	Profile	1 m^2	8 (2)	5440–734	Johansson 2013
42BO3 (Warren)	Assemblage		75 (n/a)	1180	Coltrain and Stafford 1999; Grayson 2006; Lupo and Schmitt 1997; Simms 1999
42BO4 (Willard Mound 2)	Assemblage		94 (n/a)	1250–690	Coltrain and Stafford 1999; Grayson 2006; Lupo and Schmitt 1997; Simms 1999
42BO55 (Bear River 1)	Assemblage	588 m^2	1,798 (22)	1065	Aikens 1966; Grayson 2006; Lupo and Schmitt 1997
42BO57 (Bear River 2)	Assemblage	1,791 m^2	1,220 (21)	995	Aikens 1967*a*; Grayson 2006; Madsen and Rowe 1988; Lupo and Schmitt 1997
42BO73	Assemblage		1 (1)	1150–1090	Grayson 2006; Lupo and Schmitt 1997; Coltrain and Stafford 1999; Simms 1999
42BO98 (Bear River 3)	Assemblage	3,201.2 m^2	632 (7)	1450	Grayson 2006; Shields and Dalley 1978; Lupo and Schmitt 1997
42BO107 (Levee)[d]	Assemblage	2,271 m^2	624 (6)	1250–710	Fry and Dalley 1979; Grayson 2006; Lupo and Schmitt 1997; Parmalee 1979
42BO109 (Knoll)	Assemblage	442 m^2	54 (3)	650	Fry and Dalley 1979; Grayson 2006; Lupo and Schmitt 1997; Parmalee 1979
42BO120 (Orbit Inn)	Assemblage	325 m^2	29 (1)	570–300	Coltrain and Stafford 1999; Grayson 2006; Lupo and Schmitt 1997; Simms 1999
42DV2	Assemblage	940 m^2	2 (n/a)	4400–280	Cannon and Creer 2011; Johansson 2013
42SL197	Assemblage		40 (n/a)	1380–1130	Grayson 2006; Lupo and Schmitt 1997;

Site	Analytical unit	Sampled Area	NISP (MNI)	Date Range (^{14}C yr BP)[a]	References
					Coltrain and Stafford 1999; Simms 1999
42SL230 (Salt Lake Airport)	Assemblage		0	Archaic, Fremont, Late Prehistoric	Allison 2002; Johansson 2013
42UT150 (Smoking Pipe)	Midden		1,831 (n/a)	890–350	Billat 1985; Grayson 2006; Janetski 1990; Lupo and Schmitt 1997
42UT591 (Heron Springs)	Assemblage	~51 m^2	14 (2)	650–490	Janetski and Smith 2007; Johansson 2013
42UT592 (Sandy Beach)	Assemblage	~75 m^2	3 (1)	510–450	Janetski and Smith 2007; Johansson 2013
42UT636 (Goshen Island S.)	Assemblage	~223 m^2	14 (8)	730–540	Janetski and Smith 2007; Johansson 2013
42WB34 (Injun Creek)	Assemblage		0	585–345	Aikens 1966
42WB42	Assemblage		4 (n/a)	Fremont and Late Prehistoric	Fawcett and Simms 1993; Grayson 2006; Lupo 1993
42WB185	Assemblage		5 (n/a)	1430–560	Lupo and Schmitt 1997; Coltrain and Stafford 1999; Grayson 2006; Simms 1999
42WB317	Assemblage		6 (n/a)	1015–540	Coltrain and Stafford 1999; Lupo and Schmitt 1997; Grayson 2006; Simms 1999
42WB331	Assemblage		2 (n/a)	Late Prehistoric	Fawcett and Simms 1993; Grayson 2006; Lupo 1993
Danger Cave	Stratum DV		8 (n/a)	3950–0	Grayson 1988, 2006; Jennings 1957; Rhode and Madsen 1998; Rhode et al. 2006
Hogup Cave	Strat. 16 Strat. 12–14		(2) (4)	500–250 1210–620	Aikens 1970; Durrant 1970; Grayson 2006

[a] *Following the format in Grayson's (2006) published data, date ranges in this table are the uncalibrated median values of uppermost and lowermost individual dates, omitting margins of error. Calibrated ranges (see Table 2.3) give much broader values than this format suggests, while closely overlapping dates may falsely suggest some duration to what may have been a single event (as in the dates for Feature 62, part of the hearth-cleaning event from Promontory Cave 1).*

[b] *Bayesian modeling of these dates suggests a much narrower range of occupation spanning a roughly 44-year period in the late 13th century AD (Ives et al. 2014; Yanicki and Ives 2017).*

[c] *Extrapolated values from work of Hallson (2017) and Reilly (2016); see discussion of Promontory subsistence above.*

[d] *Almost all bison specimens at the Levee site were recovered from the later of the two villages present there.*

for duration of occupations—details which are not always available in early site reports. However, when even tiny excavation areas like a 1 m^2 profile cleaning in Promontory Cave 2 from 2011–2013 have yielded greater numbers of bison specimens than large-scale excavations with faunal assemblages numbering in the tens or hundreds of thousands of specimens (39,000+ specimens at Salt Lake Airport, 120,000+ at Sandy Beach, and 261,230 specimens at 42DV2; Allison 2002; Cannon and Creer 2011; Johansson 2013), it becomes clear that bison, while present, are hardly abundant at most Fremont and Late Prehistoric sites in the Great Salt Lake area.

No site surpasses the NISPs or MNIs for bison seen in single hearth-cleaning feature (F62) exposed near the bottom of the sondage near the mouth of Cave 1, and only a few even come close. These are Bear River wetlands sites (including the later-dating of two villages at the Levee site), where the faunal samples were collected from hundreds or even thousands of square meters of excavation, and the Smoking Pipe site at the mouth of the Provo River, which appears unique in the Utah Valley for its congruence of both maize harvesting and relatively high bison consumption (Billat 1985:92; Coltrain and Leavitt 2002; Forsyth 1984). When the extrapolated values for bison calculated by Hallson (2014) are taken into consideration, Cave 1 as a whole represents hunting orders of magnitude greater than that seen elsewhere in the region.

Where unusually high levels of bison hunting are evident elsewhere in the region, at the Bear River sites and Smoking Pipe, dates from these locales straddle the transition from the Formative to Late Prehistoric periods. These sites are of considerable interest in that they may reflect not only interaction between Promontory and Fremont-affiliated groups, but an uptick in bison exploitation not typical of the rest of the Fremont era and a continuation of (or a prelude to) the lifeway seen at the Promontory Caves. Also of interest is a trend for sites dating later than the caves to show only low levels of bison procurement or an absence of bison remains entirely.

This situation is one that invites speculation and further testing of the archaeological record. One important factor to consider in this shift between Fremont and Promontory or the Formative and Late Prehistoric (both sets of terms encompass the same cultural transitions) is the health of bison populations in the Great Salt Lake area. Just as persistent periods of drought are implicated in the end of Fremont horticulture, bison populations in the Great Salt Lake area, too, may have been highly susceptible to climatic variability. The same increased summer temperatures and moisture in the Fremont area that resulted in high lake levels and promoted the uptake of horticulture on alluvial plains would also have increased the abundance of grassland forage for bison (Hemphill and Wigand 1995; Rhode 2000; Wigand 1997; Wigand and Rhode 2002). Lupo and Schmitt (1997) and Grayson (2006) have argued bison population levels were high throughout the Formative period, and that archaeological evidence shows a significant decline at about 600 ^{14}C yr BP, or the mid 14th century. The claim that "[t]his is *roughly* the time when… this area also saw declines in summer temperature, summer precipitation, and grass abundance" (Grayson 2006:921, emphasis added) stretches the evidence, however. The onset of horticulture-ending drought, which should simultaneously also have affected grassland abundance, was ca. AD 1150 (Coltrain and Leavitt 2002), about two centuries before the suggested decline in bison populations around, very approximately, AD 1350.[17] This prolonged interval is the window in which the unparalleled extent of bison hunting seen at the Promontory Caves occurred. Paleoenvironmental indicators in adjoining regions—central Utah (Fisher and Valentine 2013), southeast Idaho (Lundeen and Brunelle 2016) and eastern Nevada (Mensing et al. 2008)—suggest the period between AD 1300 and 1400 was in fact relatively wet. This trend is supported by pollen and stable isotopic analyses of bison dung and various tissues from Cave 1. While conditions were arid, the is no indication of drought or dietary stress causing a shift to less desirable forage among the bison the Promontory people hunted (Bowyer and Metcalf, in prep.).

An obstacle in evaluating these trends further is the problematic nature of date estimates for sites where some degree of Promontory–Fremont interaction may be suspected (Table 2.3). Dates generally come from a limited number of samples per site, and with very high margins of error (a product of their times when radiocarbon dates were both very expensive and of limited accuracy). While still informative in a general sense, it would be unjustifiable to uncritically accept median dates for these sites, as calibrated ranges for the reported dates in Table 1.3 show. Multiple intercepts of the IntCal13 curve—a plot of historic fluctuations in atmospheric ^{14}C levels (Reimer et al. 2013)—are often evident, as indicated by large calibrated date ranges and outlying dates.

Ranges in the calibrated dates are also often broader than the already considerable margins of error would suggest: with only a few exceptions (Bear River 3, the two early dates from Hogup Cave strata 12 and 14, and the late date from Injun Creek), the calibrated ranges overlap with the ranges of individual dates from the Promontory Culture occupation of Promontory Cave 1 and 2. Even the Orbit Inn site, reported to have "[f]ive, tightly clustered radiocarbon dates from various contexts across the site show it was occupied between A.D. 1450 and 1500" (Simms and Heath 1990:798)—centuries later than the peak occupation of Cave 1—has one date that falls into the Promontory Cave range after calibration, and most have a considerable probability of calibrating outside of the reported range.

Table 2.3. Radiocarbon dates from sites featuring intensive bison procurment and/or mixed Fremont–Promontory ceramic assemblages. Dates calibrated with OxCal v4.2 (Bronk Ramsey 2016) using the IntCal13 calibration curve (Reimer et al. 2013). Calibrated ranges with some probability of overlapping dated specimens from Promontory Caves are in italics.

Site	Reported Date (^{14}C yr BP)	Med. Date (AD)	Calibrated Date (cal. yr. AD)	Provenience and excavation details	References
Bear River 1	1065 ± 120	885	690–750 (5.1%) *761–1207 (90.3%)*	Bison scapula of unknown provenance. Site is a 24.4–30.5 m diameter mound excavated in 6–12" arbitrary levels with "no discernible stratigraphy."	Aikens 1966:56–58
Bear River 2	995 ± 105	955	778–791 (1.1%) 805–842 (2.5%) *860–1252 (91.8%)*		Aikens 1967*a*
Bear River 3	1450 ± 110	500	341–777 (95.1) 793–801 (0.3%)	Charred seeds found under ceramic sherds on floor of Structure 7. Site reported as single cultural stratum.	Shields and Dalley 1978:63–65
Hogup Cave	1530 ± 80	420	356–365 (0.6%) 381–657 (94.8%)	Grass, reeds from Stratum 12: 30–76 cm (12–30").	Aikens 1966:24–29
	1210 ± 100	740	653–999 (94.7%) 1004–1012 (0.7%)	Sticks, bark, dung from Stratum 14: 20–36 cm (8–14").	
	620 ± 70	1330	*1271–1428 (95.4%)*	Same as above.	
Injun Creek	585 ± 90	1365	*1253–1474 (95.4%)*	Unknown samples from cluster of 13 mounds and four more within a 1.2 km (¾ mile) radius were excavated as single strata.	Aikens 1966:12–14
	345 ± 100	1605	1401–1693 (85.4%) 1728–1812 (7.4%) 1919–... (2.6%)		
Knoll	640 ± 110	1310	***1155–1473 (95.4%)***	Charcoal from above central basin hearth in oval dwelling.	Fry and Dalley 1979:64–68
Levee (Late)	860 ±110	1090	*970–1308 (94.1%)* 1362–1386 (1.3%)	Timber from floor of Dwelling 1 under central burned clay mass.	Fry and Dalley 1979:9, 15–29
	710 ± 120	1240	1043–1105 (6.4%) *1118–1433 (89.0%)*	Charcoal from floor of Dwelling 2.	
	710 ± 100	1240	1050–1084 (2.7%) 1125–1136 (0.8%) *1151–1427 (91.9%)*	Timber above prepared floor of second stage of Dwelling 3.	
Orbit Inn	570 ± 60	1380	*1291–1436 (95.4%)*	Unknown samples from hearths or pits over 325 m^2 area. Site reported as single 5–90 cm thick stratum with "multiple intermittent occupations."	Simms 1999:table 3.2; Simms and Heath 1990:798–800
	440 ± 60	1510	1333–1337 (0.4%) 1398–1530 (72.2%) 1539–1635 (22.8%)		
	420 ± 70	1530	1405–1644 (95.4%)		
	380 ± 60	1570	1438–1641 (95.4%)		
	300 ± 70	1650	1444–1682 (86.2%) 1738–1753 (1.1%) 1762–1803 (6.0%) 1937–... (2.1%)		
Smoking Pipe	890 + 50	1153[a]	*1028–1226 (93.2%)* 1232–1245 (2.2%)	Unknown samples.	Janetski 1990
	860 ± 90	1115	*1014–1287 (95.4%)* 1043–1104 (7.7%)		

Table 2.3, cont'd.

770 ± 80	1198	*1118–1320 (80.9%)*	
		1350–1392 (6.9%)	
640 ± 110	1325	*1155–1473 (95.4%)*	
640 ± 70	1330	*1260–1425 (95.4%)*	
350 ± 50	1530	1452–1642 (95.4%)	

[a] *Midpoint dates for Smoking Pipe from calibrated dates reported by Janetski (1990).*

Resampling these sites to obtain larger numbers of dates, from multiple components where possible, and using high-precision AMS methods, would be a worthy undertaking. It is doubtful, for instance, that the early dates from Bear River 1 and 3 accurately date the suspected Promontory presence at those sites. However, the excavation methods employed at many of these sites renders the proveniences of dated artifacts highly uncertain. The prospective utility of existing collections for re-dating these sites is likewise diminished.

Several early investigators observed a co-occurrence of Promontory and Fremont ceramic types at sites such as Black Rock Cave 3, Stansbury Island, and Deadman Cave (Enger 1942:100–01; Jameson 1958:10; E. Smith 1941:15), but as noted by James Gunnerson (1956:71), it has long remained unclear whether assemblage-level analyses are truly evidence of association or simply a spurious product of excavation and reporting methods. Excavation of mounds as single strata at Injun Creek and Bear River 1 (Aikens 1966) offer little in way of resolution to this problem. The Levee and Knoll sites (Shields and Dalley 1979) were reported in such a fashion that could help distinguish earlier from later occupations, separately listing artifacts recovered from overburden, fill, and floors of excavated structures, and by natural strata and feature elsewhere around the sites.

Though not undertaken in the present study, these two sites offer excellent prospects for re-dating. They also present an excavation standard that is adhered to in the present report (see Chapter 4).

While the matter of accuracy remains unresolved, it can still be observed that beyond the Promontory Caves, intensive bison hunting in the Great Salt Lake area is evident only at sites where varying degrees of Fremont–Promontory interaction are indicated in ceramic assemblages, or, in the case of Smoking Pipe, where dates indicate the possibility of contemporaneity with earlier and later manifestations of the Promontory Phase. Rather than being a practice endemic to the Fremont, the intensification of bison hunting in the terminal Fremont era and during the transition into the Late Prehistoric may thus be linked to Promontory influence. Similarly, the trend in the Late Prehistoric period toward bison depletion could be a consequence not of climate change and reduced forage (Grayson 2006), but of the effect of intensified hunting—a possibility first raised by Karen Lupo and Dave Schmitt (1997:50), and perhaps a factor in the end of the occupation of the Promontory Caves by Promontory-affiliated peoples shortly before AD 1300 (Bowyer and Metcalfe, in prep.; Johansson 2013). A hypothesized scenario at the onset of the Late Prehistoric transition would include influence by Proto-Southern Dene, Promontory-affiliated peoples (identifiable both in terms of subsistence strategy and material culture) on wetlands-adapted, post-horticulturalist Fremont peoples, and, especially in the aftermath of a collapse in bison numbers, the influence of broad-spectrum Fremont foragers on Promontory-affiliated peoples. In the Bear River wetlands, pit house-dwelling people adopted bison hunting on a scale that they had not previously practiced, while evidence for interaction with Promontory peoples, especially in the form of ceramics, began to appear in local assemblages. The onset of these processes is only poorly dated; however, it can be said with some certainty that they were well underway by the mid- to late-13th century, the time of the peak inhabitation of the Promontory Caves. Further investigation is merited to examine whether changes at late Fremont settlements were synchronous with the caves' occupation, as seems best indicated by the dates from the later village at the Levee Site and many of the dates from Smoking Pipe, or whether they were underway earlier, as the less reliable Bear River dates would suggest.

Meanwhile, by the mid-14th century, diminishing prospects for big game hunters and a necessary shift to a more broad-based subsistence are reflected both at Injun Creek, where Promontory ceramics are found amidst an otherwise typical Great Salt Lake Fremont assemblage, and at sites where Promontory ceramics are predominant such as Orbit Inn, Heron Springs, Sandy Beach, and Goshen Island South. The social mechanisms for these postulated reciprocal influences and their expected manifestations in terms of preserved material culture are explored in greater detail in Chapter 4.

Summary

The time period between about AD 1150-1300 is a critical one in Great Basin prehistory, as it marks the decline of the farming and foraging peoples of the Fremont Complex who inhabited the eastern Great Basin and northern Colorado Plateau during the terminal Formative period. Ecological change, adaptive shifts, and intersocietal interaction were likely all factors in the Late Prehistoric transition that saw expressions of Promontory material culture, for a time, proliferate in the Great Salt Lake region and beyond, and not always to the exclusion of characteristically Fremont material. The high-resolution chronology for the Promontory Culture occupation of the Promontory Caves has provided remarkable clarity to the fact that what has often been regarded as a post-Fremont phenomenon was in fact flourishing during the waning stages of the Fremont decline.

The post-Formative transition is a problem of vast scope, affecting not only the eastern Great Basin and the northern Colorado Plateau, but simultaneously affecting Ancestral Puebloan communities farther south. It might seem that dwelling on a particular moment of transition, as at Promontory Point in the 13th century, is too narrow a focus to offer insight into the broader changes that took place around this time. As cautioned by Steven Simms (1990:15): "The Fremont did not all go away en masse... implying we are not dealing with a unitary problem. Thus, even if we can resolve Fremont transition in the northern Wasatch Front, it will not imply that the same fate befell all carriers of Fremont material culture." But what is the geographic scope of the Promontory phenomenon?

The people who inhabited the Promontory Caves during the peak period of occupation for much of the 13th century AD were big game hunters who targeted bison on an unprecedented scale. The intensity of hunting is indicative of familiarity with communal bison hunting on the Plains and the ethos of ceremony and spiritual sanction accompanying the practice—a far cry from the opportunistic hunting of individual animals more generally seen in the Archaic and Formative periods in the Great Basin and Colorado Plateau. From Franktown Cave on the Front Range of the Rockies to the uplands south of the Snake River Plain, a growing network of sites shows that events on Promontory Point were not taking place in isolation. They were part of a broader cultural phenomenon that extended over more than a century, that appears rooted, at least in its earliest incarnations, in a Plains-based cultural pattern, and that *did* have repercussions for much of the Fremont world.

It has also been suggested that little is known about who the peoples of the Fremont Complex were, except that they likely possessed a diverse range of ethnic identities (D. Madsen and Simms 1998; Simms 1990). Internal evidence from the archaeological record alone has always hinted at a continuum of expressions within the Fremont world, trailing off into the desert West and describing a broad zone in which can be found influences that are both Ancestral Puebloan and Archaic. Genetic data, reviewed in the following chapter, has demonstrated a separation between Fremont and ancestral Numic populations (Cabana et al. 2008; Kaestle 1995, 1998; Kaestle and Smith 2001; Parr et al. 1996). Somewhere within or beyond that ill-defined western limit of what is called Fremont must have been the ancestors of some of the peoples who today comprise the Numa; no border can be drawn, as none ever existed. To this mix can be added the Promontory people, not only late arrivals to the region, but bearers of material culture with ties to the Plains and the Subarctic that together flag them as ancestral Southern Dene. Much *is* known, then, about who the peoples of the late Fremont world likely were. More can be added to our understanding of the ethnic affiliations of the Promontory people and the Fremont peoples they came in contact with by considering additional data sources beyond material culture. These are reviewed in the following chapter.

Chapter 3: Fremont and Promontory Cultural Affiliations

Who were the Promontory people? And who were the Fremont? As reviewed in the previous chapter, archaeological data alone are not entirely mute on the subject of the identity of the Formative and Post-Formative occupants of the eastern Great Basin, particularly in outlining the ethnic and linguistic diversity of the Fremont. But beyond a prevailing consensus of discontinuity between the ethnographically attested Numic-speaking inhabitants of the eastern Great Basin and the archaeological record of anything prior to the past few centuries, details remain frustratingly vague. Even the recognition of Proto-Southern Dene links to the Promontory Phase leaves much unanswered, both in how these populations related to what increasingly appears to have been contemporary terminal Fremont peoples, and in how they are linked to highly diverse modern Diné and Ndee groups.

Additional lines of evidence allude to highly specific episodes of population movements in the more distant past, which, when integrated with archaeological data, have allowed a greatly refined understanding of the links between the Formative occupants prehistoric to modern populations to be made. The following sections outline the contributions of recent studies in population genetics, as well as syntheses of linguistics, oral history, and material culture that have yielded sophisticated interpretations of the culture historical ties between the Fremont, the Promontory, and descendant groups—respectively, Kiowa-Tanoans and the Southern Dene.

Population genetics

Much of the archaeological speculation on migration and population replacements reviewed in the previous chapter, especially in the Late Prehistoric period, took place before the emergence of population genetics and ancient DNA (aDNA) analysis, complementary tools to characterize the degree of genetic heterogeneity or homogeneity in modern and prehistoric groups. The insights genetic studies have offered into the relations between people and their ancestors in the past few decades have been nothing short of revolutionary.

The study of population genetics can broadly be divided into two principal categories: studies of nuclear DNA, the 22 autosome pairs and one sex chromosome pair in cell nuclei that recombine during sexual reproduction with contributions from each parent (totaling about 3 billion adenine–thymine or guanine–cytosine base pairs; EBI 2017), and mitochondrial DNA (mtDNA), shorter molecule strands (16,359 base pairs) contained within cell mitochondria that do not split or recombine during sexual reproduction and are instead inherited solely from the mother (Anderson et al. 1981). The shorter base pair sequences of mtDNA, coupled with much faster rates of mutation than nuclear DNA, have made mtDNA a very attractive candidate for population-level aDNA studies of phylogenetic differentiation on short timescales, with examination of paternally inherited Y chromosome DNA (Y-DNA) potentially balancing the matrilineal bias inherent to mtDNA (W. Brown et al. 1979; Castro et al. 1998). The ability to identify maternal lineages (and, currently to a lesser extent, paternal ones) has had enormous implications for the study of prehistoric population movements, the composition of social groups, and links between ancestral and descendant peoples independent of other lines of evidence. Techniques for classifying autosomal population profiles continue to be developed that offer far greater advances.

mtDNA haplogroups

At the broadest level, five founding mtDNA haplogroups have been identified for Indigenous populations in the Americas: A, B, C, D, and X, characterized by the gain or loss of a restriction site or base pair deletions and unique mutations or combinations of mutations (haplogroups A, B, C, and D; Schurr et al. 1990; Torroni et al. 1993), or a combination of C—T transitions and *Dde* I site loss (haplogroup X; D. Smith et al. 1999). The distribution of these haplogroups is nonrandom, and though considerable variability exists between geographic regions, and between modern and prehistoric populations, meaningful patterns are identifiable suggesting common ancestry between groups (Lorenz and Smith 1996; Snow et al. 2017:230). Proportions of these five ancestral mtDNA haplogroups from a selected number of modern and archaeological populations are presented in Table 3.1.

The values in this list provide only the broadest possible overview: each haplogroup can also be subdivided into subclades, or haplotypes, that reflect oftentimes highly localized subsequent mutations within each superordinate grouping, the analysis of which allows for fine-grained differentiation within otherwise ambiguous results (e.g., Achilli et al. 2013). Southern Dene peoples exhibit a high propensity for haplogroup A (i.e., Diné: A = 52%, Ndee: A = 63%), reflecting proportions of this haplogroup that are monotypic in Northern Dene populations such as the Tłı̨chǫ (A = 100%) and suggesting that mixing occurred on arrival in the Southwest (Torroni et al. 1992; Lorenz & Smith 1996). Haplogroup A is also dominant among Mesoamerican groups such as the Maya (Torroni et al. 1992), but the A2a subclade, associated with mutations at nucleotide positions 16191, 16331 and 16233, is absent in Mesoamerican populations,

Table 3.1: Reference mtDNA haplogroups for Southwest, Great Basin, and Dene populations. Following Carlyle et al. (2000) and Malhi et al. (2003), haplogroup A is most typical of Dene and Mesoamerican populations, B of the Southwest, and D of the Numic-speaking peoples from the western Great Basin, while C and X are uncommon.

	Number of	mtDNA Haplogroup Frequency (%)					
Population	Samples	A	B	C	D	X	Source
Ancestral Puebloan+	27	22	56	15	-	7	Carlyle et al. 2000
Diné (Navajo)	64	52	41	5	-	3	Torroni et al. 1992; Lorenz and Smith 1996; Malhi et al. 2003
Fremont+	32	-	75	13	5	6	Parr et al. 1996
Hopi	4	-	100	-	-	-	Torroni et al. 1992; Lorenz and Smith 1996
Kiliwa	7	-	100	-	-	-	Lorenz and Smith 1996; Malhi et al. 2003
Kiowa	5	40	-	20	-	40	Lorenz and Smith 1996
Maya	27	52	22	15	7	4	Torroni et al. 1992
Mine Canyon (Pueblo III, Middle San Juan, NM)+	20	40	50	5	5	-	Snow et al. 2010; Snow et al. 2017
Natinixwe (Hupa)	2	-	100	-	-	-	Lorenz and Smith 1996
Ndee (Western Apache, San Carlos)	38	63	13	18	5	-	Torroni et al. 1993; Lorenz and Smith 1996; Malhi et al. 2003
Numa (Northern Paiute/Shoshone)	98	-	42	11	47	-	Lorenz & Smith 1996; Kaestle and Smith 2001; Cabana et al. 2008
Stillwater Marsh (Western Great Basin)+	42	7	33	2	52	5	Kaestle 1998
Tłı̨chǫ (Dogrib)	42	100	-	-	-	-	Torroni et al. 1992; Lorenz and Smith 1996
Tommy Site (Pueblo II, Middle San Juan, NM)+	40	3	68	15	15	-	Snow et al. 2010; Snow et al. 2017
Towa (Jemez)	36	-	89	3	-	8	Lorenz and Smith 1996; Malhi et al. 2003
Zuni	26	15	77	8	-	-	Lorenz and Smith 1996; Malhi et al. 2003

+ *Denotes archaeological population*

uncommon among Northern Dene, and prevalent in Southern Dene populations, and is thus interpreted as representing a small-population founder effect associated with northern origins and subsequent southward migration to the Southwest, where bearers of other haplogroups (principally B2) joined the population (Achilli et al. 2013; Malhi et al. 2003, 2008; Tamm et al. 2007).

Not all Dene groups show this strong association with haplogroup A. The Hupa, a Dene-speaking people in northern California, appear fixed for haplogroup B, the principal haplogroup among Puebloan peoples in the Southwest such as the Hopi, Towa, Kiliwa, and Zuni (Torroni et al. 1992; Lorenz and Smith 1996, 1997; Malhi et al. 2003). A sample size of just two Hupa individuals illustrates a key issue in the interpretation of these data: without large numbers of samples, results are not always likely to accurately represent a population. Thus, the Kiowa (n = 5), a Plains-based group that is of key interest in discussions of Fremont descendants, show an abundance of haplogroup A (= 40%), presumed to be associated with Dene populations, but an absence of the dominant haplogroup among the Fremont (B = 75%) and the Towa (B = 89%), the latter being the linguistically closest-related group to the Kiowa (Lorenz and Smith 1996; Ortman 2012; Ortman and McNeil 2018). Until a larger dataset becomes available, some caution needs to be exercised in interpreting these results, either in positively identifying or in dismissing a genetic relationship.

Where sufficient samples are available, clear patterns are evident. Associations between the Ancestral Puebloans, Fremont, and modern Southwestern populations have been suggested based on the abundance of haplogroup B2 and only moderate or low frequencies of haplogroups C1 and D1 (Carlyle et al. 2000; Lorenz and Smith 1996; Parr et al. 1996; Snow et al. 2010, 2017:230). Principal sublineages within B2—notably B2a1, B2a2, and B2a4—emerged in the Southwest and

Mexico at least 9,000 years ago, but the spread of some younger lineages within B2 (such as B2a5) may be linked to the more recent spread of horticulturalist groups (Achilli et al. 2013:14310; C. Brown 2010).

The earliest arrival of Proto-Southern Dene in the Southwest has meanwhile proven difficult to detect. For instance, the Ancestral Puebloan (Pueblo III) Mine Canyon site on the middle San Juan River in New Mexico, dating to as late as AD 1300, showed haplogroup distributions that promisingly resembled Diné haplogroup proportions (Snow et al. 2010). However, recent reanalysis has shown a prevalence of non-Dene haplogroup A2 variants, of which two samples carry distinct derived mutations that have been reported in several Zuni samples, and which are also prevalent among the Chumash on the California coast (Kemp et al. 2010; Snow et al. 2017). The haplogroup frequencies at the nearby but earlier-dating (Pueblo II) Tommy Site are meanwhile statistically indistinguishable from only one ancient or modern population at the two-sigma level of probability: the Fremont from the Great Salt Lake wetlands (Parr et al. 1996; Snow et al. 2017:233; comparison made by Snow et al. using Fisher's Exact Test using GENEPOP 1.2, Raymond and Rousset 1995).

Of final note here, there is a strong association between the Northern Paiute, for whom the relatively rare haplogroup D is most common (= 47%; Lorenz and Smith 1996; Kaestle and Smith 2001), and what have been interpreted to be ancestral Numic populations at Stillwater Marsh in the western Great Basin (D = 52%; Kaestle 1998). Coupled with the extremely low occurrences of haplogroup D in other populations including the Great Salt Lake Fremont, this association supports archaeological claims of Numic expansion into the Great Basin in the post-Formative era (Kaestle and Smith 2001), but a degree of heterogeneity in both the prehistoric and modern samples, where haplogroups B and C are also common, leaves some questions unanswered. Noting uncertainty over reconstructed marriage patterns relating to a Numic expansion, Cabana et al. (2008:445) have conceded difficulty in distinguishing between continuity through stochastic genetic drift in an *in situ* Numic population and population replacement through expansion without knowing whether marriage, and hence gene flow, between groups from different geographic regions was extensive or not. Referring only to "general ethnographic and theoretical models of hunter gatherers" that would suggest movement of marriage partners between groups was both "fluid and widespread," Cabana et al. (2008:445) have offered qualified support for the Numic expansion hypothesis. Their observation that models must be refined to comment directly on demographic processes, allowing discernment between small group sizes that exchanged relatively few members with groups from other areas and larger groups that had high levels of gene flow through exogamous intermarriage, is applicable to any analysis of population genetics.

Y-DNA

Y chromosome haplogroups can shed light on patrilineal relationships, at least between the male members of populations. Ripan Malhi and colleagues (2008) found only three Y-DNA haplogroups among modern Native American populations today, and the most common of them, haplogroup R (73%), is associated with European male introgression. In a pre-contact archaeological setting, the picture would be quite different. Non-Dene populations in the Southwest presently show a mixture of haplogroups R and Q. With haplogroup R omitted from consideration, the Southwest would previously have been fixed for Y-DNA haplogroup Q (Malhi et al. 2008). Low frequencies of Y-DNA haplogroup C among Southern Dene groups (14.9% among all Indé, 8.7% among San Carlos Apache, and 1.3% among Diné) thus appear to be significant, especially as nearly all chromosomes within this haplogroup represent a single subclade (Zegura et al. 2004). This haplogroup is utterly absent among other Southwestern populations, but is relatively common among such Subarctic Dene peoples as the Tłı̨chǫ and Tanana (Malhi et al. 2008; Zegura et al. 2004).

These Y-DNA findings from modern populations provide some insight into past demographic trends. The absence of haplogroup C in other Southwest populations today suggests men of Dene origin did not commonly leave those groups, while it also appears probable that Proto-Southern Dene populations enjoined social recruitment of males. Malhi et al. (2008:420) believe the Y chromosome data to be concordant with the founder effect suggested in mtDNA among Proto-Southern Dene populations, arising from an initially small northern population that spread their language and culture through assimilation of individuals from Southwestern tribes.

Implications and limitations

While useful, there are some limitations to the aDNA data that must be addressed. Likely due to slower rates of mutation in nuclear DNA, data skew toward highlighting maternal ancestry and the movement of women while obscuring patrilineal relationships thanks to a largely heterogenous Y-DNA dataset that lacks substantial subclade diversity. As noted by Graciela Cabana et al. (2008:446), mtDNA studies "can only detect events related to female population history." Such an event would go undetected if a population expansion were dominated by the movement of men. That is, even if a large number of men possessing a distinctive mtDNA haplotype migrated and married women from their destination area, within a single generation the mtDNA profile of the descendant population would appear entirely local. On a large scale, the involvement of women in Dene migration is evident in the arrival of the northern haplotype A2a in the Southwest, but on a smaller, band-level scale, these patterns may not always be clear. In the original Malhi et al. (2003) study defining haplotype A2a, only five of 13 Ndee and Diné persons sequenced to the haplotype level possessed it. On similar grounds to those noted by Cabana et al. (2008), demographic patterns of endogamy, agamy, or exogamy could have drastic effects on the mtDNA profile of small populations, making the mechanics of group composition a critical research question.

Related to the problem of group composition is the question of how populations are defined. In the Malhi et al. (2008) Y chromosome study, specific reference was made only to the Diné and to the San Carlos Apache, the latter a federally recognized division of the Western Apache with a complex history of amalgamation and coresidence in the reservation era both with other Indé groups such as the Lipan and Chiricahua and with the neighbouring Yavapai (Goodwin 1942). All other tribes across the eastern and southern Indé range were lumped together in Malhi et al.'s work under the collective term "Apache," while in earlier genetic studies in the Southwest (e.g., Carlyle et al. 2000; Parr et al. 1996; Malhi et al. 2003), all distinction between Southern Dene groups was overlooked entirely. Deni Seymour has critiqued this failure of population geneticists to specify which Southern Dene groups their data represent:

> It would have been far more effective to distinguish genetic data from different Southwestern Athapaskan subgroups (taking into account tribes, bands, clans, and communities [...]), rather than assuming they are a homogenous lot. It is inappropriate to consider the

> Athapaskans as one people, but rather it is imperative to consider the diverse lineages of and complex historical processes relating to these modern Southwestern entities. [Seymour 2009:281]

The trend appears to stem from the somewhat uncritical citation of an early, but foundational work (Torroni et al. 1993) in which 569 genetic samples were given the generic "Apache" designation; these solely represent individuals on the San Carlos Apache Reservation. As the Torroni et al. study has become established as a standard reference, the equivocation of this data set with all the Southern Dene may be obscuring evidence for the likelihood that different identities emerged in different locations, through associations with different peoples, at different times.

Whether homogenous or highly heterogenous, modern and ancient DNA population profiles are the transient outcomes of culture-historical processes, and are illustrative of potentially complex sociodemographic dynamics. They provide a critical line of evidence in assessing the validity of postulated relationships between peoples, with a degree of resolution that is unparalleled in other data streams. Ultimately, historical narratives constructed from genetic data are of greatest worth when taken into consideration alongside robust archaeological, ethnographic, and linguistic data.

Eastern Fremont and Proto-Kiowa-Tanoan

Fremont ties to the Northwest Plains have been a matter of longstanding speculation based on broad similarities of material culture, especially rock art motifs (Aikens 1966, 1967b; Gebhard 1966; Janetski 1994; P. Schaafsma 1971; Wormington 1955). The topic of a Fremont exodus from the eastern Great Basin and Colorado Plateau to the Plains has recently been revisited by Scott Ortman (2010b, 2012:416–418; Ortman and McNeil 2018) based in part on a cultural inventory of Proto-Kiowa-Tanoan—that is, reconstructed terms drawn from similarities in modern forms of the Plains-based Kiowa and Pueblo-based Tanoan languages (Tiwa, Tewa, and Towa) that provide clues about their geographic, temporal, and technological position in an ancestral state prior to their divergence. Ortman has posited that just as Proto-Kiowa-Tanoan was spoken by Late Archaic peoples of the Basketmaker II archaeological culture on the southern Colorado Plateau that gave rise to major Ancestral Puebloan sites such as Mesa Verde, speakers of this proto-language may also have been involved in the processes of bilateral diffusion and demic expansion along the San Juan, upper Colorado, and Green River drainages that saw the adoption of maize and squash horticulture and the emergence of the Eastern Fremont by about AD 400. Subsequent differentiation, in part as a result of geographic isolation from other languages in the Kiowa-Tanoan language family, gave rise to the Proto-Kiowa language sometime before AD 450, possibly linked to the emergence of Fremont variants of the upper Green River, Uinta Basin, and Great Salt Lake areas.

Tewayó

The name for a Proto-Kiowa-Tanoan homeland north of the present-day Rio Grande pueblos of eastern New Mexico is known from the Tewa language: Tewayó, 'Place of the Tewas' (Ellis 1974:2; also *Tewayóge*, 'great Tewa place,' J. Harrington 1916:572; Ortman 2012:188). The term was first reported in Spanish accounts and maps from the mid-1600s onwards (variously as El Teguayo, Gran Teguaio, Tehuayo, etc.; Hodge 1910:718; S. Tyler and Taylor 1958). Though it refers to present-day pueblos—that is, "the country of the Tewa… and perhaps of the Tigua [Tiwa], in New Mexico" (Hodge 1910:718), the term has also been used by these Tanoan-speaking peoples to refer to an ancestral homeland on the San Juan River and to a mythical origin place farther to the north (Ellis 1974:2).

The many Spanish references to Tewayó have long been fraught for their difficulty in teasing apart that which is true from that which was exaggerated and that which was misinterpreted. Stories of an ancient Puebloan homeland are both entangled with the politics of the Pueblo Revolt of 1680 and conflated with myths of the Lake of Copala, birthplace of Montezuma, and Cibola, the seven cities of gold, that led to the disappointments of Marcos de Niza and Francisco Vázquez de Coronado in 1539–40 (Chavez 1967:121–122; Ortman 2012:188–196). Ortman (2012) has argued that Tewa oral tradition most strongly corresponds to Mesa Verde, and that this is the ancestral homeland to which the Tewayó of the Spanish accounts must have applied, but some Tewa oral traditions recorded in the 20th century speak of Mesa Verde and the San Juan as an intermediary step in a migration from yet farther north and northwest (Aniceto Swaso, cited in Jeançon 1923:75–76; A. Ortiz 1969:148–149; Spinden 1933:97). It is these references to a more distant ancestral place of emergence that draw the Fremont area—the eastern Great Basin and northern Colorado Plateau, and most especially Utah Lake—into consideration in reference to Tewayó.

The most detailed descriptions of Tewayó come from the ca. 1686 report of Alonso de Posada, a Franciscan friar in New Mexico, to the Spanish Council of the Indies on the poorly known territories of Quivira and Teguayo (Posadas 1882). Posada set out to present the most trustworthy information he could gather about the then-uncharted "provinces" to the northeast and northwest of Santa Fé, the capital of the Spanish province of New Mexico, particularly in response to the claims of Don Diego de Peñalosa Briceno, an exiled former governer of New Mexico, describing great riches at a distant lake (Ortman 2012:192; A. Thomas 1982; S. Tyler and Taylor 1958).

Citing a Towa informant from Walatowa (Jemez Pueblo) named Juanillo, Posada reported that far to the northwest of Santa Fé, "there was a large lake populated all around its borders" (S. Tyler and Taylor 1958:305); it is the possibility that Juanillo's account "may well refer to Utah Lake" (Ortman 2012:194) that merits its brief consideration here. Posada provided very specific details on the location of this lake and adjacent territory, saying it was reached by travelling directly northwest, first crossing a mountainous region called "Navajo… a land possessed by the Apachas [i.e., Dinétah]," and crossing a great river (probably the San Juan) to enter the "Yutas [Ute] Nation…. Crossing through this nation about sixty leagues in the same northwesterly direction, one then enters some hills at about fifty leagues distance and the nation the northern Indians call Teguayo" (S. Tyler and Taylor 1958:303–06), wherein the lake was located. Juanillo claimed to have "been captive in Teguayan provinces for a period of two years,"and that "there were many people who spoke different languages there, and some that were spoken in New Mexico" (S. Tyler and Taylor 1958:305). Posada calculated the total distance from Santa Fé at about 180 leagues, a league at that time being equivalent to the distance a man on horseback could walk in an hour, or about 4.23 km, which would place Tewayó in the vicinity of Utah Lake (S. Tyler 1952:323; S. Tyler and Taylor 1958:306; Warner 1995:5).

Ortman (2012:194) is skeptical of Juanillo's account, suggesting that conflation of Tewayó and Copala was a strategy employed in the context of the Pueblo revolt by people seeking to resist domination "in the hope of arousing fear and anxiety among the Spanish." This argument is unconvincing, though, considering that this very conflation was being used by Peñalosa to arouse interest among Spain's enemies in mounting an expedition of conquest (Ortman 2012:192). Granted, Posada was no Coronado, and he appears to have found Juanillo's account reliable because it was not embellished with tales of silver and gold, instead describing ordinary people living by ordinary means (S. Tyler 1952:313–319; Tyler and Taylor 1958:285–286). Other details, including references to the Diné, the Utes, and the correct description of the location of the river that demarcates their respective territories (Ortman 2012:193), are reasonable reports of the territory north and west of Santa Fé for this era.

If accepted as uncontentious, Juanillo's account, as related by Posada, offers the suggestion that parts of the eastern Great Basin as far as Utah Lake existed in linguistic contrast to the Numa and Southern Dene, and that even at this late date a diverse population here included speakers of a language or languages related to Tanoan. This claim would remain untested for almost a century after Posada's time, at which point it was found either to be false or that the demographic situation had substantially changed. Franciscan priests Silvestre Vélez de Escalante and Atanasio Dominguez, the first Spanish visitors to Utah Lake in 1776, described long-abandoned pueblos along their route via the San Juan, Green, and Uinta Basins, and arriving at the lake they met the Timpanogos, a Numic-speaking people. Vélez opined that the earlier reports of Tewayó were "nothing but the land by which the Tihuas, Tehuas and the other Indians transmigrated to this kingdom [i.e., New Mexico]… To which is added the prevailing tradition with them, which proves the same" (Letter of Fray Silvestre Vélez de Escalante to Fray Morfi dated April 2, 1778, Archivo General de la Nación, Historia, Tomo 2, cited in S. Tyler 1952:329).

Whether cultural affinities can be drawn solely between Tanoan-speaking Puebloans and Ancestral Puebloan groups of the San Juan or also to other peoples farther north that fell within the spectrum of eastern Fremont cultural occupations may not be resolvable beyond this degree with the records from New Spain. Oral traditions from the speakers of a related language on the Plains, the Kiowa (thus comprising the Kiowa-Tanoan language family), provide further compelling reasons for considering Proto-Kiowa-Tanoan links to the Fremont world.

Kiowa odysseys

A Pueblo-centric perspective long prevailed regarding the origins of the Kiowa. Most notably, Alfred Kroeber (1939) argued for Kiowa being a relatively recent splinter from the Tanoan languages of the Southwest as Puebloan peoples took up a bison-hunting lifestyle (see also Brant 1953; Kroskrity 1993:56). The Puebloan origin hypothesis has never been in alignment with well attested Kiowa oral traditions, historical documents, and place names in the Kiowa language that describe a historical homeland, ca. 1700, in southwest Montana and the headwaters of the Yellowstone River in northwest Wyoming, and that demonstrate social memories of leaving that area for the Central and Southern Plains by the early 1800s (Abel 1939:154; M. Boyd 1981:7–21; J. Harrington 1939; Meadows 2008:114–117; Mooney 1898:152-168; Nabokov and Loendorf 2004:67–75; Ortman 2012:418; H. Scott 1911:368). No support can be offered for the more radical suggestion that *all* Proto-Kiowa-Tanoans originated on the Northern Plains, with Tanoans leaving the Plains in the distant past and the Kiowa departing more recently (J. Harrington 1910, 1939; Schlesier 1994): aside from the Kiowa, there is no hint of a Plains-based, bison-hunting lifestyle in the oral traditions or languages of Tanoan speakers. Similarly failing the oral history test is Nancy Hickerson's (1994, 1996) hypothesis that the modern-day Kiowa were in fact the Jumano of eastern New Mexico and west Texas during the Spanish colonial period, whose origin could in turn be traced to the Jornada variant of the Mogollon culture.

James Mooney (1898) described oral traditions of an original Kiowa migration onto the Plains in detail:

> [T]he earliest historic tradition of the Kiowa locates them in or beyond the mountains at the extreme sources of the Yellowstone and the Missouri, in what is now western Montana. They describe it as a region of great cold and deep snows, and say that they had the Flatheads (*Â'daltoñ-ká-igihä'go*, "compressed head people") near them, and that on the other side of the mountains was a large stream flowing westward, evidently an upper branch of the Columbia [i.e., the Snake River]. These mountains they still call *Gâ'i K'op*, "Kiowa mountains." Here, they say, while on a hunting expedition on one occasion, a dispute occurred between two rival chiefs over the possession of the udder of a female antelope, a delicacy particularly prized by Indians. The dispute grew into an angry quarrel, with the result that the chief who failed to secure the coveted portion left the party and withdrew with his band toward the northwest, while the rest of the tribe moved to the southeast, crossed the Yellowstone (*Tsósá P'a*, "pipe (?) stone river"), and continued onward until they met the Crows (*Gaā-Kíägo*, "crow people"), with whom they had hitherto been unacquainted. By permission of the Crows they took up their residence east of that tribe, with which they made their first alliance. Up to this time they had no horses, but used only dogs and the travois. For a while they continued to visit the mountains, but finally drifted out into the plains, where they first procured horses and became acquainted with the Arapaho and Cheyenne, and later with the Dakota. [Mooney 1898:153]

A number of key details can be drawn from Mooney's ethnographic work. The earliest memory of the Kiowa's journey onto the Plains occurred to the northwest, not the southwest; similarly refuting a Puebloan origin is his observation that the Kiowa "have no tradition of ever having been an agricultural people or anything but a tribe of hunters" (Mooney 1898:153). A northern Rocky Mountain homeland is quite clear from references to the eponymously named mountains of the Yellowstone area, familiarity with neighbours in that region, and descriptions of geography in the Pacific watershed. A progression of alliances and meetings with new groups correctly describes the order in which they would have been encountered in the 18th century. Finally, the remark that the Kiowa's transition to equestrianism took place on the Plains and not beforehand is noteworthy in relation to their longstanding enmity with the Comanche, a people that acquired the horse early and likely played a role in driving the still-pedestrian Kiowa out of the mountains and onto the Plains (Keim 1885:183, 194).

Numerous authors have attempted to reconcile Kiowa-Tanoan linguistic ties with disparate oral traditions, examining the possibility of north-to-south, south-to-north, or south-to-north-to-south migrations (e.g., I. Davis 1959; Gunnerson 2007; Kinkade and Powell 1976:90; Marriott 1968:120; C. Schaafsma 1981; Trager 1967:348; Walde 2006). Ortman's (2012) work is transformative in this regard, using reconstructed linguistic terms for flora and fauna from Kiowa and Tanoan to identify the Colorado Plateau as the geographic area where speakers of the ancestral form of these languages (i.e., Proto-Kiowa-Tanoan) last resided together. Speculation on migration routes and cultural affiliations can be narrowed down to a very restricted area and timeframe. While the southward movement of Ancestral Puebloan groups that became the Tiwa, Tewa, and Towa is supported, so too is a northbound migration of adjacent Fremont people to "beyond the headwaters of the Green River [in southwest Wyoming], by around AD 1300" (Ortman 2012:417–418), from there gradually into the Yellowstone headwaters in the Rocky Mountains, and then onto the Northwest Plains, thus aligning with Kiowa oral tradition.

Ortman draws on several lines of archaeological evidence to support his hypothesis for Kiowa origins among the Fremont of the northern Colorado Plateau. The first is a shift in obsidian utilization and the interaction networks they represent in the 13th century Utah Valley. Obsidian sourced from southern Utah came to be replaced by Malad obsidian from southern Idaho, as well as Bear Gulch in southwest Montana and Obsidian Cliff in Yellowstone National Park (Janetski 1994, 2002). This trend in long-distance exchange may signal the establishment of kinship ties to the Northwest Plains formed through migration processes (Ortman 2012:417). Ortman suggests similar kinship ties may be reflected in the occurrence of Fremont-style basketry at Idaho and Wyoming sites postdating the Fremont era (Adovasio et al. 2002) and the noted similarities between Fremont grayware and the pottery at Dismal River sites found in association with tipi rings (Aikens 1966:80, 1967*b*:201).

Similarities have also been observed between Eastern Fremont rock art and the Castle Gardens rock art style of south-central Montana and north-central Wyoming, which features abraded panels painted with shield-bearing warriors and other shared motifs (Aikens 1967*b*:201; Francis and Loendorf 2002:136–144; P. Schaafsma 1971:142–145; Wormington 1955:162). This rock art style dates to the mid-13th century and later (Francis and Loendorf 2002:141–142), potentially signaling the time period in which these new social networks were first established—a time depth deeper than that reached by Kiowa oral tradition, but suggestive of the duration of Kiowa residence in the Rocky Mountains. The iconography of the Castle Gardens style, including shield-bearing warriors, weeping eyes, and horned headdresses, features prominently in the ethnographically attested artwork of the Kiowa (Greene 2001; Merrill et al. 1997).

Recent work by William Meadows (2016) has provided additional linguistic insights into the route and timing of the ancestral migration of some members of the modern-day Kiowa. Meadows (2016:542) begins by noting that, as with the oral traditions of many other groups, great caution should be exercised in interpreting stories of ancestral migration as the history of a single culturally and linguistically homogenous group that moved as a single unit from a single point of origin. A cursory review of the ethnographic literature on the Kiowa, Meadows suggests, would suggest that they simply split from an earlier people, as suggested in the account of a dispute and schism while still in the Kiowa Mountains reported by Mooney (1898:153). In fact, a very different process likely describes their origins:

> Most southwestern American Indian "tribes" contain traditions from families and clans that merged together from multiple locations to form larger, better-known cultures over the last few centuries. These represent multiple cases of ethnogenesis. Distinctions between tribal and family histories are also typical of Kiowa oral history, as certain genres remain well preserved on a [sic] intratribal basis, while others exist more in particular communities or lineages and may rarely be spoken of in public contexts… myriad other personal and family experiences are sometimes rarely known outside of particular families. [Meadows 2016:546]

The contrast between the coalescence of lineages and clans into larger tribal identities, or *ethnogenesis*, and the emergence of cultural identities through branching and splitting from an earlier parent form, or *phylogenesis*, is a touchstone in theories of cultural evolution, detailing the processes by which new cultural identities emerge over time (discussed in Chapter 4). The point

Meadows makes about tribal identities forming through blending and merging and the ensuing paradox of defining any single oral tradition in such circumstances as being representative of the larger group has its archaeological parallels. From a migration perspective, both in oral tradition and in the archaeological record, what can appear to be the movement of a single group of people may in fact be the movements of numerous groups that joined together over a period of time (Echo-Hawk 2000:274; Meadows 2016:546). Meadows therefore offers the caveat that the oral tradition he reports, and which differs somewhat from accounts reported by earlier ethnographers such as Mooney (1898), represents the family history of some, but not necessarily all Kiowa. This same caveat can and should be considered when examining the oral histories of any group, and in a similar vein, the material culture of an archaeological population.

The oral tradition discussed by Meadows is the family history related to him on several occasions by the late Parker P. McKenzie, a Kiowa linguist and historian who was born in 1897 and was raised by his maternal grandparents. During his childhood, McKenzie learned the oral traditions of his matriline from his grandmother that, including his generation, extended back ten generations, possibly to the late 1600s (Meadows 2016:543–544). The account conveys the story of a south-to-north migration that took place west of the Continental Divide prior to the Kiowa's acquisition of the horse in the 1700s (Meadows 2016:549–552). Five key lexical items from this family-specific oral tradition are summarized here in chronological order.

The account first describes passing northward through an area containing uninhabited stone masonry cliff dwellings, not of Kiowa making. This reference thus connects some ancestral Kiowa to a region spanning from northern New Mexico to northeast Utah. The most obvous parallel, as for the abandoned pueblos observed by Escalante in the 18th century, would be to Mesa

Verde (cf. Ortman 2012:196). Meadows (2016:549) argues that the Kiowa term *xóqáujódáu* (lit. 'stone cliff house people/inhabitants), by referencing cliffs, would exclude open-air Fremont adobe or stone-walled structures, but it should be noted that some masonry-walled residential structures are known from Fremont-attributed cliffside caves on Range Creek and Nine Mile Canyon in east-central Utah (Gillin 1938; Morss 1931:28, 1954; Spangler 2013) and the Yampa River in northwest Colorado (Burgh and Scoggin 1948).

The account next refers to a region where wooden rabbit hunting sticks—clubs cast at ground level to kill or incapacitate small game—were used. This technology was less common to the Plains than the Great Basin, Southwest, and Colorado Plateau (Driver and Massey 1957:358; Koerper 1998:255–256).

McKenzie's ancestors proceeded northward through a mountain range called Íjàqóp, referencing an old Kiowa ethnonym for the Ute (literally 'looking for game' or 'bison hunters') and their periodic incursions onto the Plains (Meadows 2013:16). Meadows (2008:45, 261) has previously attributed this as a contemporary Kiowa term for the central Rocky Mountains of Colorado, but its use in McKenzie's account is from a period long prior to the Kiowa's arrival on the Plains, or even to the headwaters of the Yellowstone. With Ute groups presumably moving in recent centuries themselves, it is unclear whether the term refers to the same mountain range at that earlier time. The Uinta Mountains offer one conspicuous alternative where a similar transition between generalized foraging and bison hunting was well established in antiquity, and along the route of the northward-trending migration described by McKenzie.

Mention is next made of a region where water flowed in the direction of the setting sun. No specific watercourse or specific number of watercourses is indicated, though a continuing residence west of the Rocky Mountains is implied. The final geographic referent in McKenzie's account is to an enormous canyon, "larger than any they had ever encountered" (P. McKenzie, cited in Meadows 2016:551), and described using an archaic term (*xóhótcá*) that has since been replaced in the Kiowa language with a term for mountain pass. In keeping with the order of the previous items, Meadows ruled out the large west-flowing rivers with pronounced canyons in western Colorado as being too far south, and river valleys east of the Rocky Mountains as being of insufficient size. The reference could be to the Green River, which while south-flowing features an impressive array of canyons for much of its length from Flaming Gorge, on the north side of the Uinta Mountains, to its confluence with the Colorado River. McKenzie himself (cited in Meadows 2016:551) believed that given its great size, the reference could have been to the Snake River Canyon of south-central Idaho.

Here, then, McKenzie's oral history appears to intersect with the earliest stages reported by Mooney (1898:153), in which the Kiowa were familiar with tributaries of the Columbia, the nearest of which would be the Snake. The general trend of a northwestern migration path corresponds with another interesting detail from Mooney's work, that of a schismatic division in which one group proceeded northwest and was never heard from again while the others moved out onto the Plains. At the time of his work, Mooney reported a widespread belief among more elderly Kiowa that their lost relatives were "still in existence beyond the mountains somewhere to the north or northwest of their old home" (Mooney 1898:154). No ethnographic or linguistic evidence exists for Tanoan-speaking groups in the Interior Plateau. However, Mooney's collection of a single unusual, carved cradleboard that would yield head flattening, and its owner's claim that it was of a style formerly made by the Kiowa (Mooney 1898:154–155), suggest close contact with peoples of the upper Columbia River and its tributaries. Per McKenzie's interpretation of his family oral tradition, this would reflect a period during which his ancestors resided on the Snake River before crossing the Rocky Mountains eastward.

While all of these events are reported to have been experienced by the single individual from the tenth generation relative to McKenzie, Meadows notes the early aspects of the story may have occurred over a longer period of time, with earlier events becoming codified and attributed to a single distant ancestor and originator of the account (Meadows 2016:552). Greater reliability exists around the relational aspects of the chronology—the order of events and their occurrence relative to the period of Kiowa residence in the Rocky Mountains, as well as an ultimate origin of at least some Kiowa in or passing through the parts of the northern Colorado Plateau that were home to the Uinta Fremont.

Kiowa and Kiowa Apache

While both Ortman and Meadows point to Kiowa origins on the northern Colorado Plateau, neither author has drawn attention to the longstanding association between the Kiowa and the Kiowa Apache, a Dene-speaking people often referred to as the Plains Apache, nor have they addressed the possible origins of that relationship. Overlooked as a result is what could be an essential aspect of a putative Proto-Kiowa, post-Fremont migration first into the Rocky Mountains, and then onto the Plains.

If, as Ortman (2012:417) has suggested, a shift in obsidian utilization in the Utah Lake area to northward-looking sources reflects kinship ties related to migration processes, then Proto-Kiowa peoples leaving the Great Basin for the Yellowstone headwaters and southwestern

Montana—the region today remembered as the Kiowa Mountains—appear to have maintained connections with the region they left behind. But this leaves unresolved the question of how the ancestral Kiowa were able to gain social access to these northern lithic sources or to that mountain homeland in the first place. It is, after all, an unlikely proposition that the areas they came to reside in at any stage of their migration trajectory were empty. Just as kinship ties reached back to the Great Basin, they may also have begun reaching northward. This process is well illustrated with the example of the Kiowa's later migration onto the Northwest Plains, facilitated first through alliance with the Crow, and then obtaining their permission to reside in or adjacent to their territory (Mooney 1898:153). Strong relations with the Crow were maintained through the exchange of children for two or three years to learn each others' languages, though captive-taking and adoption also occurred (Mooney 1898:156, 217). The Kiowa were also quite predisposed toward building kinship ties through intermarriage, common in historic times with numerous Northern Plains peoples including not just the Crow, but also Dene peoples including the Kiowa Apache and the more northerly Tsuut'ina, as well as the Arikara, Lakota, Arapaho, and Cheyenne (Mooney 1896:908, 1898:153–64, 1907:701; J. Harrington 1939; John 1985; Meadows 2008:114–21, 2013, 2016:306). The mitochondrial DNA sample size for the Kiowa (Table 3.1; Lorenz and Smith 1996) is too small to allow much reliable interpretation, but an unusually high frequency of haplogroup A offers a tantalizing indication of at least some intermarriage with Northern Dene populations; haplotype-level data on a greatly expanded sample would be needed to evaluate this possibility further.

Meadows (2016:553) contends that it was in the eighteenth century in northwestern Wyoming and southwestern Montana where the Kiowa "are reported to have made friends with the Crow and Plains Apache." However, Mooney's informants were emphatic on the point that the Kiowa-Kiowa Apache alliance formed far earlier.

> Incorporated with the Kiowa, and forming a component of their tribal circle, is a small tribe of Athapascan stock, commoinly known as Apache or Kiowa Apache, but calling themselves *Nadiisha Dena*. They are not a detached band of the Apache tribe proper of Arizona, as has commonly been supposed, but came down with the Kiowa from the north, and neither tribe has any tradition of a time when they were not associated. [Mooney 1898:156]

Mooney would reiterate this point in a later discussion on Kiowa Apache origins:

> They have not migrated from the southwest into the plains country, but have come with the Kiowa from the extreme north, where they lay the scene of their oldest traditions, including their great medicine story. Their association with the Kiowa antedates the first removal of the latter from the mountains, as both tribes say they have no memory of a time when they were not together. [Mooney 1898:247]

William Philo Clark, too, was aware of the temporal extent of this relationship, having reported the southward migration trajectory for the Kiowa from the Black Hills in the late 18th century and noting, "without doubt they had previous to that time lived near the Missouri River. The Apaches with whom they are now associated were at this time with them" (W. Clark 1885:229). A migration from the headwaters of the Missouri was also noted by Keim (1885:190) for the Lipan, a separate Ndee group. From the context of his discussion linking them to the Kiowa and the Comanche, whom he said were their allies, though, Mooney (1898:248) argued that Keim was speaking of the Kiowa Apache.

While it is possible that the relationship between the Kiowa and the Kiowa Apache originated along the Yellowstone–Missouri headwaters, the absence of an oral tradition highlighting this point, unlike what exists for the Kiowa relationship with the Crow, would suggest that it extends back beyond the memory of oral history. (Somewhat counterintuitively, Gunnerson and Gunnerson [1971:14–19] argued the absence of a clear oral tradition on their union must mean the Kiowa-Kiowa Apache union began later, but Mooney was unambiguous on the time depth of the relationship.) Ultimately, the question of the timing, location, and impact of the Kiowa–Kiowa Apache relationship, and by extension its possible relation to the Fremont–Promontory transition, remains unresolved at present. The conjunction of hypothesized direct historical ties between the Kiowa and the Fremont and between Proto-Southern Dene and the Promontory requires that discussion of Kiowa ethnogenesis not be considered in isolation from Dene migration.

Proto-Southern Dene in Relation to the Great Basin

The migration of Dene peoples from the Canadian Subarctic and the emergence of the Southern Dene on the Plains and throughout much of the Southwest is a topic of vast scope. For all the historic evidence that exists, however, documenting the position of Southern Dene groups at the time of European contact, one significant gap must be addressed: no reports are known identifying a Southern Dene presence in the Great Basin. The ethnographic work of Mooney (1898:153) reviewed above that places the Kiowa Apache with the Kiowa "in or beyond" the Rocky Mountains at the Missouri and Yellowstone headwaters, and to a lesser degree the passing notices of observers such as Keim and Clark, may be the closest such records come to linking any historic

Southern Dene group to the archaeological material from the Promontory Caves. Historic records do, however, document major population movements hinting at the proximity, at various times, of other Southern Dene groups, especially along the eastern slopes of the Rocky Mountains and in the Central Plains, where the Dismal River Phase is best represented and where the Kiowa and Kiowa Apache are not reported to have been until very late according to their oral traditions (Meadows 2016; Mooney 1898).

The following synopsis is intended to address the linguistic and historic evidence that pertains to the movement of Proto-Southern Dene via or in proximity to the Great Basin and how this may relate to the archaeological evidence reviewed in Chapter 2. This begins with a review of the principal conjectures drawn by linguist Edward Sapir (1936) for a route of Dene migration from the Subarctic to the Southwest that he felt most likely would have bypassed the Great Basin in favour of the Plains. Also reviewed here are the position of the Kiowa Apache in relation to the other Southern Dene, early Spanish and French historic records that describe the geographic location of Southern Dene groups, and the necessity of disambiguating the Kiowa Apache from the more generically applied term "Plains Apache."

Dene migration

A deep historical relationship between the Southern, Pacific Coast, and Northern Dene languages, uniting peoples from the American Southwest to the western Subarctic, was first noted in 1852 by William W. Turner (Goddard 1996*b*:294). The elaboration of the relationship between these languages as a product of prehistoric population movements is elegantly crystallized in a paper by Edward Sapir (1936), in which he drew on internal linguistic evidence from the Diné language to demonstrate that the ancestral Southern Dene homeland lay in the Subarctic. The directionality of Dene migration identified by Sapir swiftly gained widespread acceptance (i.e., Opler 1938:381; Steward 1937*a*), though the archaeological challenge of identifying the timing and particular routes of this migration has remained a focus of ongoing work (i.e., Ives 2017; Seymour 2012*a*).

By the time of the first Spanish *entrada* into New Mexico, numerous Southern Dene groups were well established in the territory surrounding the Rio Grande Pueblos and on the Central and Southern Plains. While it has been argued that the southernmost extent of this migration was reached only very recently, in the period following the Pueblo Revolt of 1680 (C. Schaafsma 1981; Wilcox 1981), there is a growing body of archaeological evidence linked to Southern Dene on the Plains and across much of the Southwest dating two or three centuries prior to that (Brunswig 2012; Gilmore and Larmore 2012; Seymour 2012*b*), and early estimates have placed them on the frontiers of the Puebloan world as early as AD 1300 (Brugge 1981:490).

At the opposite end of the migration route, several authors have pointed to two volcanic eruptions near the Alaska-Yukon border as the likely triggers for a massive disruption of Subarctic-dwelling Northern Dene peoples, sending displaced peoples first into neighbouring territory southward and eastward, followed by ongoing movement by some groups through the Interior Plateau and others onto the Plains, ultimately giving rise to the Pacific Coast and Southern Dene (Ives 1990, 2003, 2014; Matson and Magne 2007; P. Mullen 2012; Workman 1979). Two major eruptions of the Bona-Churchill massif are known from a widely distributed tephra termed the White River Ash: the north lobe ca. 1900 BP (Lerbekmo et al. 1975) and the east lobe occurring between AD 846–848 (Jensen et al. 2014).

It is the larger, more recent east lobe eruption that is most relevant to the origins of the Southern Dene. Some 47 km^3 of rhyolitic tephra was distributed over $540,000^2$ km of boreal forest in the Northern Dene heartland, at least 2 cm thick over much of the Mackenzie Basin and exponentially increasing up to a thickness of 80 meters near the source volcano (Lerbekmo 2008:694–96). The ashfall would have blanketed vegetation, fouled waterways, and rendered vast swathes of territory temporarily uninhabitable to humans (Workman 1979); this event is also the suspected cause of drastic depopulation in southern Yukon woodland caribou herds around 1000 years ago (Kuhn et al. 2010). Thus, the Dene migration from the Subarctic to the Southwest can be bracketed between the east lobe eruption in the mid-9th century and the earliest archaeological evidence for Proto-Southern Dene at the south end of the route by ca. the 14th century. This corresponds well with linguistic projections for the differention of Ndee dialects from each other beginning at around AD 1200, and with differentiation of Proto-Southern Dene from Northern Dene languages several centuries earlier (Golla 2008, cited in Ives 2011).

Sapir's foundational linguistic work relied upon just four Diné terms that either referenced northern concepts that had since fallen out of use, that indicated a newfound familiarity with a concept gained through a migration southward, or both: the word for 'gourd', especially as used in the Southwest as a dipper or cup, was derived from northern terms for 'horn spoon'; the verb for seeds scattered on the ground, rather than referencing sowing or planting, was derived from northern terms for drifting or falling snow; the word for 'corn' can be literally translated as 'enemy-', 'foreign-', or 'alien-food'; and an obscure metaphor for insomnia in which sleep somehow 'glides away' uses a northern term for traveling by canoe, an activity that among non-river faring Navajo had been "entirely effaced from tribal memory" (Sapir 1936:233). Ives and Rice (2006; Ives in prep. [the search image paper sent earlier today]) have noted other examples of shared neologisms across Southern Dene dialects for flora and fauna that are not found in the Subarctic (e.g., terms for maize, Plains bison, wild turkey, lizard, cactus, and tobacco), and for items of material culture that are associated with them (such as the term for pipe). In addition to evidencing a southward migration and a general reluctance among Dene speakers to borrow words from other languages, these words suggest that Proto-Southern Dene resided on the Plains as a contiguous speech community, with differentiation presumably occurring after new terms had entered a shared lexicon (Golla 2008; Ives and Rice 2006).

Though the terms Sapir examined provide scant additional detail about possible migration routes, he felt a "direct line of movement from north to south" linking the Dinétah to the Subarctic, effectively traversing the Great Basin, would be "most improbable" (Sapir 1936:235). Instead, he thought that a route via the western Plains was far more likely, and if this supposition were correct, Southern Dene cultures, and their prehistoric antecedents, should show evidence of four "strata," or stages of migration:

1. An original layer of cultural attributes in common with Northern Dene groups,
2. A second stage where Proto-Southern Dene groups acquired attributes associated with life on the Plains in the pre-equestrian era,
3. A third stage of contact with non-Puebloan peoples as Proto-Southern Dene began to enter the Southwest, and
4. A final stage of distinctively Puebloan influence.

In regards to the first stratum, Sapir (1936:235) specifically identified the Mackenzie Basin east of the Rocky Mountains as a probable point of origin for the Southern Dene. Snoek et al. (In prep.) have demonstrated the fallacy of attempting to isolate strongest affinities between any one language of this region, such as Dënesųłiné. Rather, the Southern Dene language subgroup most likely traces its roots to a hypothesized proto-language common to both it and several Dene languages of the eastern Subarctic. Genetic evidence has also greatly lent itself to demonstrating the origins of the Southern Dene in the western Subarctic, albeit with a more granular resolution than the linguistic data increasingly provide. Archaeological evidence of a prehistoric migration from this region has been notoriously difficult to obtain, in part owing to poor preservation conditions over large expanses of territory and in part attributable to Dene ancestors' rapid uptake of the material culture local to areas where they migrated (Ives 1990, 2003; Le Blanc 2009). The non-perishable materials from the Promontory Caves, especially moccasins, are of critical interest in this regard, suggesting a timeframe recent enough for such traditions not yet to have been lost, or aspects of material production critical enough to the signaling of group identity that they endured.

In many ways, Sapir's proposed second stratum also appears borne out. The pan-Southern Dene neologisms identified by Ives and Rice (2006) allude to familiarity with the flora and fauna of the Plains, lending weight to Sapir's suggestion that Proto-Southern Dene migration followed that route. These terms present an interpretive challenge for a proposed alternate route to the Southwest via the Interior Plateau (Matson and Magne 2007), though that route remains of interest in relation to the origins of the Pacific Coast Dene (see Ives 2011). Perhaps the most significant hallmark of a stage of migration on the Plains, from an archaeological perspective, would be evidence for the adoption of a communal bison hunting tradition—something that must be considered more than a mere subsistence shift, but a wholesale commitment to a rigidly constrained complex of ceremonial behaviours (cf. Oetelaar 2014). The material record from the Promontory Caves provides compelling evidence for a people who must have undergone the same period of residence and cultural elaboration on the Plains as Sapir hypothesized for other Proto-Southern Dene.

Ives (2010:330) has outlined the logic of a shift to bison procurement in terms of the *push* and *pull* factors that play into large-scale migration processes (following Anthony 1990:900–01):

> [If] the massive eruption that emplaced the east lobe of the White River Ash… was indeed the "push," the "pull" was the attractive nature of the Plains bison hunting lifestyle in its own right. The ethnohistoric record for the Plains region shows that every major language family adjacent to the Plains (that is, Athapaskan, Algonquian, Uto-Aztecan, Tanoan, Siouan, and Caddoan) sent multiple representatives onto the Plains in terminal prehistoric or protohistoric times, with every indication that such events have occurred repeatedly in the deeper prehistoric past. The Plains bison hunting lifestyle was inherently attractive: it was associated with… the capacity to produce significant economic surpluses on a regular basis. Such surpluses would fuel the trade with Plains periphery societies that would ultimately propel Apachean speakers into the Southwestern and Southern Plains settings in which the Spanish first encountered them in the 16th century (trading just such products).

It may be possible to somewhat refine Sapir's otherwise broad proposed route "via the western Plains": David Brugge (1983) observed that at more southerly latitudes, the higher elevations of the Rocky Mountains and adjacent foothills are ecologically similar to the Subarctic. An intermontane migration route would have allowed Dene groups of northern origin to find already-familiar flora and fauna in a restricted geographic zone. Staying near the mountains and moving southward along the Rockies, Proto-Southern Dene could have spread across them or farther onto the Plains once they gained sufficient knowledge to exploit these new environments (Brugge 1983:489)—gained, that is, through interaction with peoples resident to those areas.

The reasoning behind an intermontane migration route is helpful in addressing the eventual divergence between western and eastern Southern Dene groups (discussed below), by situating Proto-Southern Dene at one time on the divide between the Plains and the Colorado Plateau. By occupying an area that may have been considered marginal to horticulturalist or bison-hunting inhabitants of lower elevations on either side, Proto-Southern Dene may have been in less direct competition with neighbouring peoples, with the notable exception of Numic groups of the Post-Formative era, who also expanded into similar territory.

A geographic position along the central or southern Rocky Mountains in the later stages of southward Dene migration is also useful in distinguishing Sapir's third and fourth strata—an initial stage of Proto-Southern Dene contact with non-Puebloan peoples as Proto-Southern Dene began to enter the Southwest, and a second stage of distinctively Puebloan influence. As noted by Brugge (1983:489), "It is possible that limited knowledge of agriculture and ceramics was acquired during the migration; but without knowledge of the peoples met on the way, the extent of change is difficult to assess." In the mountainous uplands at the headwaters of the Missouri, Yellowstone, and Platte rivers, or along natural corridors through the Rocky Mountains such as the Wyoming Basin, linking the Colorado Plateau to the Plains, there would be numerous opportunities for Proto-Southern Dene to establish contact with Proto-Kiowa-Tanoans or other participants in the Fremont complex, and encounters or even absorption of such groups by migrating Proto-Southern Dene could have occurred (Aikens 1967*b*, 1972:63–64; Brugge 1983:489). A body of Diné oral tradition describes a period of social recruitment of both Dene and non-Dene language speakers, individually or as groups, that Paul Zolbrod (1984:279) has referred to as "the Gathering of the Clans." While it seems likely that peoples with strong ties to the Ancestral Puebloan communities in and near Dinétah participated in and influenced this stage of Diné ethnogenesis (Aberle 1963; Zolbrod 1984:408), the same integrative processes may well have been underway among Proto-Southern Dene on the northern Colorado Plateau and even into the eastern Great Basin in the mid-thirteenth century.

Given Steward's (1937*a*) observation at the Promontory Caves of northern "Athapaskan" and Plains-like traits being integrated with cultural attributes from the Puebloan area and its "northern periphery" (that is, the Fremont), and the ongoing confirmation of these findings by the Promontory research team (Billinger and Ives 2015; Ives 2014; Ives et al. 2014; etc.), Sapir's suggestion that contact with peoples of the Great Basin likely did *not* factor into Southern Dene origins would thus appear to have been in error. Here the possibility of connections between the Dismal River complex on the Plains and both Fremont and Promontory in the eastern Great Basin and northern Colorado Plateau must be drawn into sharp focus: if Dismal River does indeed represent a Proto-Southern Dene presence on the Central and Southern Plains, the acquisition of a technomic complex including ceramic production and more sedentary residence in semi-subterranean structures may represent Sapir's postulated third stratum of cultural changes arising from contact with non-Puebloan peoples. How, when, and where this contact took place remains to be fully explained, but it would be imprudent to dismiss the role of the Promontory Culture and Fremont Complex in relation to this larger question of Southern Dene ethnogenesis.

Proto-Southern Dene diversity

The massively disruptive influences arising from centuries of Spanish, Mexican, and American interaction, from contact to colonization and war, have been instrumental in shaping the Diné and various Ndee nations. While now residing principally in the southwestern United States, ancestral groups were widely distributed at the time of European contact across both the Southwest and the Southern and Central Plains, with consolidation into the communities known today being a matter of historic record (for a detailed review of the Jicarilla example, see Eiselt 2012). The term Proto-Southern Dene is not intended to refer to a single unitary or self-referential people in the past: judging from early historic accounts, reviewed later in this section, Southern Dene groups were far more numerous than they are now. Nor is it necessarily the case that descendants of all southward-migrating people who passed via the Plains or the Colorado Plateau and even, for a time, resided in the Great Basin would consider themselves "Apachean," in the sense that this exonym is commonly used today.

Indeed, the Kiowa Apache historically did not consider themselves to be Apache (Keim 1885:189; Mooney 1896:1081, 1898, 1907). Lexicostatistical studies support the distinction of the Kiowa Apache language from more closely related western (Diné, San Carlos) and eastern (Jicarilla, Mescalero) Ndee dialectical variants, based on divergent phonology (Hoijer 1938; Huld 1985:461), vocabulary (Hoijer 1963, 1971:4–5), and semantic structure (Snoek 2015). Describing a broad arc from west to east and extending onto the southern Plains, Kroeber (1939:48) felt that the Kiowa Apache were Ndee peoples that "stayed in the Plains." Mooney felt the dissociation between Kiowa Apache and Ndee was in fact more extreme, asserting that the former had "never had any political connection with the Apache proper and were probably unaware of their existence" until about

1800 (Mooney 1898:246)—an accurate estimation of Harry Hoijer's (1971:4; Table 3.2) later finding that, while "Navajo, San Carlos, Chiricahua, Mescalero, Jicarilla, and Lipan are simply closely related dialects of a single language [,]… Kiowa Apache is a second Apachean language equidistant from each of the six dialects."

Table 3.2. Percentages of shared cognates in Southern Dene word lists (from Hoijer 1971; see also Hoijer 1963); note close dialectical relationship between most Ndee variants, while Kiowa Apache is distinct.

	San Carlos	Chir.	Mesc.	Jica.	Lipan	Kiowa Apache
Diné	94	95	95	94	92	75
San Carlos	x	96	94	93	90	74
Chiricahua		x	97	95	93	75
Mescalero			x	96	95	74
Jicarilla				x	94	76
Lipan					x	75

Mooney's view was informed by the recognition of the Kiowa Apache strictly as the group of Dene language speakers affiliated with the Kiowa, and not the more broadly construed "Plains Apache"—a term with great potential for misuse and confusion, owing to the large number of historically attested Ndee groups that resided on or periodically visited the Plains, and the likelihood that migration occurred via the Plains prior to and during the time of early European contact. Recognition of the distinction between the Plains Apache in this broader sense from the "Kiowa Apache," both in historical and geographical terms, is essential for making some sense of the possible affiliations between the archaeological cultures reviewed in the previous chapter—especially the Promontory Phase in the Great Basin and the Dismal River Phase on the Plains—and descendant communities today.

The earliest historical references to the Southern Dene appear in records of the first Spanish incursions into the Southwest and the Plains, beginning with Coronado's meeting the Querechos on the Llano Estacado in 1541 (Castañeda 1896). From the 1580s onwards, such peoples as the Apaches de Nabajó, Apaches de Quinía, Apaches de Gila, Carlana Apaches, and Vaqueros, among many others, are mentioned residing at various distances from the pueblos of Santa Fe de Nuevo México, the Spanish and later Mexican province of New Mexico, on the upper Rio Grande (Benavides 1630; Pérez de Luxán 1929:86, 111–114; A. Thomas 1935; Zárate Salmerón 1966:94; see summaries in Brugge 1983; Eiselt 2012; Gunnerson and Gunnerson 1971). Terms from this period for Southern Dene local groups—John (1975) listed 24 different examples—applied variously to tribes, bands, and extended families. They referenced leaders, as in the case of the Apaches de Quinía and the Carlanas, or geographic ranges, as with the Gileños (after the Gila River) and the Navajo, the latter a term probably borrowed from the Tewa *navahu* ('field' + 'wide valley'), by which the Spanish designated the Dinétah heartland south of the San Juan River, and which has endured as the most common exonym for the Diné (Benavides 1630; Brugge 1983:496; J. Harrington 1940:518; Hewett 1906; Reeve 1956:298–303; A. Thomas 1935). Descriptions from this era provide a picture of groups that had thoroughly penetrated the southwest, hunted bison, in some cases (as with the Diné and groups that merged into the Jicarilla) had adopted horticulture, and engaged in both trading and raiding relationships with their Puebloan neighbours and other peoples of the Plains and Southwest.

Throughout the Spanish colonial era, Dene groups ranged widely across the Southern Plains: Paloma Apaches, Cuartelejo Apaches, Faraon Apaches, Carlana or Sierra Blanca Apaches, and eventually the Jicarillas are mentioned in Spanish records of the late 15th and early 16th

centuries (Champe 1949; Eiselt 2012; Gunnerson and Gunnerson 1971:10–13; Tyler and Taylor 1958:306). Accounts variously describe warfare between them and other Plains-based peoples such as the Wichita, Pawnee, Comanche, and Utes (A. Thomas 1935; Tyler and Taylor 1958:300–301); alliance and coresidence with the Towa of Pecos Pueblo and the Tiwa of Taos Pueblo (Forbes 1960:132, 265; A. Thomas 1935: 81; Villa-Señor 1748:240); and historical displacements, tribal mergers, and absorption of refugee populations linked in part to the emergence of the modern-day Jicarilla (Eiselt 2012; Gunnerson and Gunnerson 1971:11–13; A. Thomas 1935).

Although Spanish records describe a number of Ndee peoples living on the Plains, early accounts from New Mexico make no mention of direct contact with either the Kiowa or the Kiowa Apache. Through much of the 18th century, "[T]he most remote borderlands of the Apaches" known by the Spanish on the Central Plains were inhabited by the Palomas, who were first encountered in 1719 (Antonio de Valverde, cited in A. Thomas 1935:132). By this time, the Palomas had suffered severe depredations from the Pawnee and lived as a refugee population among the Cuartelejos and Carlanas near the Sangre de Cristo Mountains. The Palomas also were pursued southward by the Comanche and Utes, and by the mid-1750s had probably ceased to exist as an independent entity, eventually becoming incorporated into the Jicarilla and other unidentified groups (A. Thomas 1935:144, 229, 232; Gunnerson and Gunnerson 1971:12–13). Though they extended beyond the range of other Southern and Central Plains-based Apache, the Palomas' territory seems to have been contiguous with those other southern groups, which would indicate they were part of the same Southern Dene dialectical chain described by Hoijer (1971), and not the more linguistically and geographically removed Kiowa Apache.

The Palomas' enmity with the more northerly Comanche and Utes is of some note, since Mooney (1898:157, 161-62) reported the Kiowa and Kiowa Apache to be contesting the Dakota and Cheyenne for territory decades later and much farther north—in the Black Hills between 1775 and 1805—and also that the Comanche at this time were to their south, on the Platte River system. The Kiowa Apache might then seem to have been part of a contiguous cluster of Southern Dene groups on the Central and Northern Plains, next in line past the Palomas and beyond the reach of Spanish reporting, and with the advancing Comanche wedged between them. Kiowa oral tradition is unambigious, however, in asserting their only being present at the Black Hills after being driven out of the Rocky Mountains, before they had gained access to horses, again at the hands of the Comanche who did have them (Keim 1885:183, 194), and presumably with the Nai'ishandine whom they had allied with long before (Mooney 1898). From this, it would seem that as the Palomas were being forced *out* of the Plains, and south, the Kiowa and Kiowa Apache were being forced *in*, and east. Rather than being neighbouring groups (and therefore speaking closely related dialects), numerous peoples, including the Crow and Arikara, and later the Comanche, would have stood between the Palomas and the Kiowa Apache at any time. To this can only be added the caveat that the earlier history and geographic position of the Palomas, the origin of their conflict with the Comanche, and the possibility of some earlier intermontane affiliation or proximity with the Kiowa Apache is purely a matter of speculation.

Kiowa Apache vs. Plains Apache

The Kiowa Apache first appear in Spanish historic records in 1746, when a single reference by an unattributed author mentions a "native of the Apache Kiowa tribe" (doc. 183 in Twitchell

1914:73). The reference describes the purchase of a 12-year-old boy from another group of Apaches, suggesting a hostile state of affairs between the Kiowa Apache and the boy's captor; historical enmity between the Jicarilla and Kiowa Apache was also noted by Morris Opler (1938:381–83). The Kiowa Apache's close association with the Kiowa is evident at this time, the latter also being known to the Spanish through the purchase of captives from other tribes as slaves (Brugge 1965; Chavez 1950:249; Gunnerson and Gunnerson 1971:17; A. Thomas 1940:114–17). The Kiowa do not appear to have come in direct contact with the Spanish until they began conducting raids into New Mexico in 1803 (Brugge 1965:188). A Spanish emissary, Juan Lucero, attempted to contact and make peace with them in 1805 and 1806, one time unsuccessfully on account of the great distance he had to travel to do so (Carroll and Haggard 1942:134, 135; Gunnerson and Gunnerson 1971:18; Loomis and Nasatir 1967:449–451), again with the Kiowa being situated far to the north.

While the Kiowa and Kiowa Apache came to the attention of the Spanish quite late, it is often held that references to the Kiowa Apache and the Kiowa are made in earlier French accounts (Gunnerson and Gunnerson 1971; Hyde 1951; Mooney 1898:246, 1907:701–702; M. Wedel 1973). While travelling up the Mississippi River in 1682, René-Robert Cavelier, Sieur de La Salle, learned of a distant people called the Gattacka and their allies the Manrhout.[18] The source of his information was one of two "Pana slaves" he had been gifted by the Illinois Michigamea (Nicolas de La Salle, *Relation* ca. 1685, in Margry 1876:569, 1898:65, and M. Wedel 1973:203; R. de La Salle, letter to La Barre dated June 4, 1683, in Margry 1879:324–325). The slave, a teenaged boy who spoke some French, explained that the Gattacka and Manrhout lived south of his homeland on a western tributary of the Mississippi some 200 leagues (approx. 850 km) west of the Illinois territory, and that they had many horses, presumably stolen from the Spanish (R. de La Salle, letter dated June 4, 1683, in Margry 1879:324–325; Margry 1879:168, 201–2, 289–90). 'Gattacka' is the exonym by which the Kiowa Apache were known to the Caddoan-speaking Pawnee, which might make 'Manrhout' an otherwise unattested exonym for the Kiowa (Mooney 1898:246).

The only major tributaries of the Mississippi to extend that far west are the Missouri, Arkansas, and Red Rivers, along with several principal arteries of the Missouri such as the Kansas and Platte. The suggestion that the Kiowa Apache and Kiowa were an equestrian people positioned south of any one of these river systems in the late 1600s, deep on the Central or Southern Plains in what would now be Nebraska, Kansas, or even Oklahoma, and raiding from the Spanish, is a considerable departure from the Kiowa oral traditions and Spanish historical records that have been reviewed here. (For comparison, the distance from the Yellowstone headwaters to the confluence of the Missouri and the Mississippi is roughly 2,100 km, or 500 leagues.) Their presence this far south at such an early date would, by the same token, make them well-suited candidates as progenitors of the Dismal River aspect dating to the 1650s or later (J. Gunnerson 1956, 1960; W. Wedel 1955). Without such coincidental timing, the Dismal River attribution is greatly suspect. Much then hinges on the identity of La Salle's informant.

It can safely be stated that La Salle's informant was a speaker of a Caddoan language. In addition to the Pawnee, other Caddoan-speaking peoples used very similar terms for the Kiowa Apache: the Wichita sometimes referred to them as "Ga'taqkä" (Mooney 1896:1081), while the Arikara told Lewis and Clark of their neighbours to the west and southwest, the "Cat-ar-kah" or "Cataka" and the "Ki-e-wah" or "Cay-au-wah" in 1804 (Thwaites 1959:101–2, 190). Caddoan-speaking groups had a considerable geographic range, from the Middle Missouri to Louisiana. If the people to whom La Salle referred to as "Pana" could be better narrowed down, the location of the Manrhout and the Gattacka, and their identification as the Kiowa and Kiowa Apache, could be verified. The reasons why such an identification *cannot* be made with any confidence requires a close reading of a number of historical sources, in which a number of conflicting claims can be found.

At a glance, the boy's homeland, the "nation of the Pana" as reported by the Sieur de La Salle (undated autograph fragment, pre-August 1683, in Margry 1879:189), seems synonymous with the Pawnee, from the lower Missouri River basin. The timing of La Salle's account, however, comes decades before the period when Mooney's (1898) Kiowa informants said they left the Rocky Mountains, presumably accompanied by the Kiowa Apache, and as much as a century before they left the Black Hills. The Gattacka and Manrhout's position south of the Pawnee would thus be much too far south to be in accord with Kiowa oral tradition circa 1680.

More difficulty arises from French embroilment in the gifting and exchange of slaves on the western frontier of New France in the late 17th and early 18th centuries. Powerful Iroquoian and Algonquian groups (and likely others) around the western Great Lakes and upper Mississippi engaged in the capture and gifting of slaves as a form of reparations between enemy parties, to serve through adoption as replacements for individuals killed in war, and to establish diplomatic alliances. Groups such as the Illinois and the Ottawa raided deeply into the Central and Southern Plains in pursuit of captives, many of whom ended up sold to the French in exchange for munitions and political considerations (Rushforth 2003). The term "Pana" at this time did not refer to a single ethnic group in this era; the usage of this and similar terms in New France (e.g., *pani* or *panis*) designated slaves of Indigenous North American, as opposed to African, descent

(Hamilton 1898:23; Rushforth 2003; Trudel 1960; Woodson 1920:263–264). Of the many similar names that appear in early French accounts (i.e., Panimaha, Panetoca, Paneake, and Paneassa), only some can be linked to modern equivalents, all would have been subject to slaving raids by groups such as the Illinois, and none are unequivocally ancestral to the Pawnee (Newcomb 2001; Parks 2001; Rushforth 2003:788–789).

In a *Plains Anthropologist* article on the boy's identity, Mildred Wedel (1973:209) nevertheless argued that La Salle must have been referring to a specific tribe on the grounds that *panis* was not a general term for slave until about 1700; she was in error, however, on this point. As early as 1672, the term "Panys" was used to refer to an enslaved captive of the Ottawa from an unknown western nation (Perrot 1864:103–104; Rushforth 2003:786). Since La Salle never used the term *panis* in his own writing, Pana was not an autonym of any group, and usage of the vague term disappeared entirely in French writings after 1702 (M. Wedel 1973:206-07), it may be that this was simply an idiosyncratic spelling of *panis*, and was treated as such by Pierre Margry, the historian from whose volumes La Salle's writing is most commonly known (e.g., Margry 1879, 1888, 1898; see Delanglez 1940:299; M. Wedel 1973:204).

Given latitude for interpretation, some have concluded that the Pana of La Salle's account might be the Arikara, being located farther up the Missouri River than the Pawnee and therefore more likely having the Kiowa and Kiowa Apache for neighbours around 1680 (Gunnerson and Gunnerson 1971:15; Hyde 1951; Mooney 1907:701–702). This conclusion remains at odds with Kiowa oral traditions stating that only after about 1700 did the Kiowa and Kiowa Apache begin coming in contact with Northern Plains peoples such as the Crow, Arapaho, Cheyenne, and eventually the Dakota. The Arikara would still seem too far south and east. In was only much later, as the Kiowa and Kiowa Apache were in the final stages of quitting the Black Hills, that a trading relationship between them and the Arikara was demonstrably established: in 1804, Lewis and Clark described both the Kiowa and Kiowa Apache, who hunted bison and spent their winters near the mountains, coming from southwest of the Arikaras on the Middle Missouri "to trafick and bring horses and robes" (Thwaites 1959:190). Conversely, after reviewing the few other historical mentions of the Pana, Mildred Wedel (1973:207–11) concluded that La Salle might in fact have been referring to the Wichita, who resided even farther southeast in the area between the Kansas and Arkansas River systems. While the Arikara interpretation, accepted by Mooney, Hyde, and the Gunnersons, would require that Kiowa oral tradition is as much as a century or more in error, the Wichita argument would require that the oral tradition be discounted entirely. Wedel (1973:213) felt that her ethnohistorical analysis of early French primary sources reinforced the hypothesis espoused by Kroeber (1939) and Brant (1953) of a recent Southwest origin for the Kiowa Apache.

At least two other possibilities for the identity of the Pana exist: one is that they were an unknown group on the point of extinction around the time of French contact, rendering the task of associating them with a modern nation impossible. Little more can be said for this line of reasoning, except that in order for La Salle's informant to be in accord with Kiowa oral tradition, he would have had to have been gravely mistaken both about the distance to his homeland and about the direction and extent of slave-taking expeditions in that era, which are understood to have primarily targeted the lower Missouri and Mississippi.

Another possibility, considered by James and Dolores Gunnerson (1971:15) and accepted by William Newcomb (1970:3), is that the Pana have been correctly identified as either the

Arikara, Wichita, or Pawnee, but that the term Gattacka was in fact a more general Caddoan word not just for the Kiowa Apache, but for *any* Dene-speaking group on the Plains (i.e., Plains Apache in the broadest sense). It should be noted that La Salle's account precedes by several decades Valverde's mention of the northernmost Ndee, the Palomas, who were by 1719 refugees from conflicts that appear to have been related to the growing demand for slaves in New France (Swanton 1942:52-54, 265-71). Three years previous to Valverde's report, a Spanish missionary named Francisco Hidalgo, hoping to convert the Caddo tribes, learned from the French on the Mississippi of people upstream raiding the Plains Apache for slaves (Swanton 1942:52–54, 265–271). As noted by the Gunnersons (1971:16), this "is almost certainly an account of the conflicts that led the Paloma Apaches to abandon their lands."

If the more generalized meaning of Gattacka is correct, by virtue of moving onto the Plains, the Kiowa Apache may have come to be referred to on the same terms by default. Even if this is the case, the identity of the Manrhout remains unresolved. La Salle only noted the association between Gattacka and Manrhout once, and there is no linguistic evidence to bolster the identification of the Manrhout as the Kiowa. Alternatively, La Salle's ambiguous term may have been the southernmost division of the Wichita that Henri de Tonty referred to as the Maintou, Mentous, or Mentons in 1693 and 1700 (Delanglez 1939; Pease and Werner 1934; M. Wedel 1973:211). It would not be unusual to see an alliance between an Ndee and non-Ndee group. The fact that French emissary Jean-Baptiste Bénard de La Harpe reported representatives of the "Quataquoil" (i.e., Katakwa, or Gattacka) in a Wichita camp on the Cimarron River in 1719 (Margry 1888:289–290; M. Wedel 1973:212) supports the inference of a more general Plains

Apache-Wichita alliance, but does not resolve the identification of the Gattacka as a particular group.

Later Spanish sources, as already noted, support the Kiowa and the Kiowa Apache being located very far to the north of New Mexico (Brugge 1965; Carroll and Haggard 1942:134, 135; Chavez 1950:249; Loomis and Nasatir 1967:449–451; A. Thomas 1940:114–17; Twitchell 1914:73). American and Canadian sources such as Lewis and Clark (Thwaites 1959:190) and Pierre-Antoine Tabeau (Abel 1939:154) definitively placed the Kiowa and Kiowa Apache at the headwaters of the Yellowstone and the Loup Rivers and travelling from the Rocky Mountains to attend a rendezvous with the Arikara and other nations in the vicinity of the Black Hills in the early 1800s.

While the early Spanish and French sources demonstrate that the Apache peoples were a dominant force on the Central and Southern Plains in the period immediately prior to contact, they also paint an unfortunately confusing picture of the Kiowa Apache, which has resulted in conflicting interpretations of the historic record. The authors who have openly questioned the veracity of Mooney's description of an enduring alliance between the Kiowa and the Kiowa Apache instead have offered that the Kiowa Apache were either a northern Ndee group that the Kiowa encountered only after entering the Plains and allying with such groups as the Crow (Gunnerson and Gunnerson 1971:14), or that they were a southern Ndee group that departed the Southwest together with the ancestral Kiowa (M. Wedel 1971). Neither oral history, ethnography, nor linguistic data support such close historic associations between the Kiowa Apache and the Ndee. Wedel's interpretation in particular requires a considerable disregard for Kiowa oral tradition and only a rudimentary grasp of the relationship between the Kiowa-Tanoan languages.

An interpretation of the term Gattacka as a Caddoan referent to the Plains Apache in general, who were diverse and widespread at the time of European contact, and recognition of the problematic conflation of the term Plains Apache with the Kiowa Apache (cf. Newcomb 1970), requires the least omission or rejection of insights on the relationship between the Kiowa and the Kiowa Apache provided by Mooney, and of oral history describing an ancestral Kiowa homeland in the Rocky Mountains and only a very late entry onto the Plains. This interpretation offers further parsimony with linguistic evidence for greater separation between Kiowa Apache and Southern Dene languages with each other by positing both geographic and chronological removal from an arc of Southern Dene peoples that stretched, at the time of European contact, from the Southwest onto the Plains.

Summary

This chapter set out to review genetic, linguistic, ethnographic, and historical data for their applicability in identifying possible cultural affiliations for the archaeologically known Fremont and Promontory peoples. From this review, several consistent trends emerge.

First, in terms of genetics (albeit only to the level of mitochondrial rather than autosomal DNA examined here), Fremont populations show some broad affinity to Ancestral Puebloan groups, and appear distinct from Numic populations of the central and western Great Basin. Southern Dene populations, in bearing a predominant substratum of Northern Dene mitochondrial haptlotype A2a, are distinct from either. However, they also demonstrate considerable admixture with Southwestern populations, including a skew in favour of the social recruitment of women. This social recruitment could have occurred in stages, and especially features B haplotypes common to Fremont and Ancestral Puebloan populations, but only very rarely the D haplotypes common to the Numa.

Linguistic data and oral tradition coincide in linking both Tanoan-speaking peoples of the Rio Grande pueblos and the Kiowa to Ancient Puebloan centres of the Mesa Verde area of the San Juan Basin, and to the adjacent northern Colorado Plateau. This would appear to situate an ancestral Proto-Kiowa-Tanoan homeland within the range of the Uinta Fremont, and though drawing from very scant evidence, may place speakers of related languages as far as Utah Lake. The divergence of the languages may then be linked to a southward migration of Proto-Tanoans and a north-northwest migration of the Proto-Kiowa, as attested by their respective oral traditions.

References to the Great Salt Lake do not appear in either set of oral traditions, but accounts from the Kiowa related by Mooney (1898) and especially Meadows (2016) both at least skirt the area, making reference to periods of residence west of the Rocky Mountains, including within virtually the entire Uinta Fremont area, contact with the Ute, familiarity with the Snake River Basin, and divergence there from other related groups, culminating in the arrival of the Kiowa proper in an ancestral homeland on the upper Missouri and Yellowstone. Significantly, Kiowa alliance with the Kiowa Apache extends beyond the time depth preserved in these traditions, and their mutual entry onto the Plains occurred both quite late, in the Protohistoric period, and very far north, with the Crow being their closest neighbours. If some Proto-Kiowan groups arrived on the Plains at an earlier time, for instance immediately following the 13th-century upheavals that affected both the Ancestral Puebloan and Fremont worlds and which may in turn be linked to incipient forms of the Dismal River Phase, no memory of such appears in the reported oral traditions, which are dominated by the Yellowstone narrative.

Most Ndee groups are more explicitly linked to the Central and Southern Plains, as well as the Sangre de Cristo Mountains, the southernmost subrange of the Rockies, in the earliest historic records of Spanish New Mexico. Both Intermontane and Plains-based migration routes are both likely and plausible mechanisms for Proto-Southern Dene arrival into the Southwest, and this distinction is an interesting consideration in the distinction between western and eastern Southern Dene languages. While an Intermontane migration route would conceivably also have passed through the Uinta Fremont area on the northern Colorado Plateau, Dene migration would largely be considered to have passed the Great Basin by were it not for the findings from the Promontory Caves. The possibility of Proto-Southern Dene contact with terminal Fremont peoples within narratives of Southern Dene ethnogenesis has been given little serious consideration, works by Aikens (1966, 1967*b*, 1972) and Brugge (1983) being notable exceptions.

The polyethnic roots of the Diné, noted both in genetic terms and as encapsulated within the coalescent oral historical theme of the Gathering of the Clans (Zolbrod 1984), merit greater consideration than has been offered in this brief review. Southwestern influences on Diné oral tradition are undisputable, and for the source of such influences, we may look to adjacent Puebloans, to the Ancient Puebloan centres within Dinétah and at nearby Chaco Canyon, and to those other groups which may have been encountered along the route of Proto-Southern Dene migration. In this last grouping we may find traces of contact with, and potentially consolidation with late Fremont peoples. However, the bulk of consideration has been given here to the Kiowa Apache, largely on account of their longstanding relationship with the Kiowa and the reasons for situating Proto-Kiowan peoples within the eastern Fremont world that have been explored through much of this chapter.

Though historical accounts relating to the Kiowa Apache have been subject to conflicting interpretations, I believe they are sufficient to demonstrate a far northern presence on the Northern Plains, in close association with the Kiowa, until comparatively late in time. Pre-1700 and even pre-1800 references to the Gattacka on the Central and Southern Plains do not muddy these waters, provided an understanding that references to the Plains Apache need not mean the Kiowa Apache, but rather any of a number of other peoples such as the Palomas that were part of a wide-ranging eastern Ndee diaspora and that ultimately were absorbed into such groups as the Jicarilla. The distinction is important both in identifying archaeological precursors to the Ndee on the Plains, and in establishing a degree of spatial and temporal separation between the Kiowa Apache and the Ndee that precludes the latter being one end of a contiguous diaspora. Kiowa Apache separation from the broader movement of Proto-Southern Dene peoples, supported both by heightened linguistic divergence (Hoijer 1938, 1963, 1971; Huld 1985; Snoek 2015) and an ethnographically attested self-identification as non-Apache (Keim 1885; Mooney 1898), appears to go back further, at least to the Kiowa's days on the upper Yellowstone and probably earlier still, to a time of mutual residence west of the Rocky Mountains.

When and where Proto-Southern Dene peoples first arrived west of the Rockies is a matter of greater speculation, and one that appears to extend to a time-depth beyond what historical and ethnographic records describe. Two suppositions can tentatively be drawn from the data so far reviewed here. One is that Proto-Southern Dene in any of several possible intermontane corridors, ranging from the Snake River Plain in the north to as far south as the uppermost Colorado and San Juan basins, would have been well positioned to encounter the ancestors of northward-moving Kiowa groups prior to their arrival at the upper Yellowstone. The other is that those Proto-

Southern Dene that did cross into the intermontane region, and especially those that penetrated as far west as the Great Salt Lake area in the 13th century, would have had to overcome a greater number of geographic and potentially social obstacles, the latter in the form of intervening non-Dene groups such as the advancing Numa, to maintain ties with other Proto-Southern Dene either straddling or east of the Continental Divide. This heightened separation might be enough to account for the linguistic and ethnic distinctiveness of the Kiowa Apache in relation to other Southern Dene, especially if it occurred well prior to meeting other neighbouring peoples of the Southwest with whom Proto-Southern Dene eventually became familiar. This is not to suggest that Kiowa Apache ancestors were the only Proto-Southern Dene to follow an Intermontane migration route; rather, theirs was probably the most divergent. The topic of migration routes will be returned to again in Chapter 7, following a review of what insight archaeological evidence can add to the discussion.

With increased clarity of the timing and nature of Fremont–Promontory interaction from new archaeological findings, answers to questions about the onset of the longstanding association between the Kiowa and the Kiowa Apache, and the presence of other Proto-Southern Dene in the terminal Fremont world, may be within grasp. What is so far lacking from this discussion is some consideration of the exceptional social conditions that, when so much of the historic literature reviewed here revolves around hostilities and war, would instead encourage cross-cultural differences to be overcome and allow intergroup alliances to form. At the heart of the following discussion is the acknowledgement that cultural identities are not static, and so one looking for a particular group in the archaeological past is bound to find only disappointment. One may, however, hope to find the precursors from which modern social identities emerged.

CHAPTER 4: INTERGROUP CONTACT AND ETHNOGENESIS

Many lines of evidence pertaining to Proto-Southern Dene and Proto-Kiowa-Tanoan origins indicate the importance of the physical movement of people and of cultural exchanges: the flow of information between groups. The preceding chapters have reviewed examples from oral tradition, historical records, genetics, and material culture. These processes can be seen as fundamentally ethnogenetic in character (cf. Ammerman and Cavalli-Sforza 1984; Cavalli-Sforza *et al* 1988, 1994; Collard and Tehrani 2005:109; Moore 1994*a*, 1994*b*; Shennan and Collard 2005). Though the diversity of Southern Dene groups at the time of European contact makes it clear that splitting and differentiation were also common, historic examples of coalescence documented in the records of Spanish New Mexico and the close association between the Kiowa and the Kiowa Apache exemplify the drawing together of individuals and groups with different backgrounds and the emergence of shared cultural forms from blended rather than divergent cultural traditions.

In this chapter, I present the theoretical underpinnings of social identities (ordered by scale: families, local groups, and regional ethnicities) and the role of group formation principles in processes of ethnogenetic and phylogenetic culture change. The intention here is not simply to assert that Southern Dene and Kiowa ethnic identities are the product of ethnogenetic processes—a claim that is more descriptive than explanatory—but that ethnogenesis is the product of context-specific structural constraints. In the case of Proto-Southern Dene and Proto-Kiowa societies, both kinship systems and subsistence strategies may have predisposed them to pursue cooperative strategies and to recruit members from other groups. From this, I present a model for the archaeological detection of ethnogenetic versus phylogenetic change, by which the hypothesis of contact between Promontory and Fremont peoples, potentially an early stage of broader Proto-Kiowa and Proto-Southern Dene ethnogenesis, can be tested. A contextualized, direct historical approach is of considerable explanatory power in interpreting Promontory–Fremont interaction in the mid-thirteenth century and ensuing group movements and cultural expressions.

Linguists have observed that phylogenetic models are particularly inadequate in explaining the relationship between Dene languages. In fact, with the exception of Southern Dene and perhaps Pacific Coast Dene (Snoek 2015:41), "the overlapping distribution of numerous diagnostic features over the continuum formed by these languages precludes meaningful sub-classification into a tree with discrete branches" (Goddard 1996:4, citing Krauss and Golla 1981:68). However, ethnogenetic processes of blending and coalescence—in linguistic terms, horizontal transfer of words from one language to another—are not immediately offered as an alternative, owing perhaps to a remarkably conservative aspect of Dene languages in which words are very seldom borrowed from other languages, with Dene people preferring instead to coin new terms from within their existing lexicon (Ives and Rice 2006). On these grounds, even when other lines of evidence point to close association with non-Dene groups, through recruitment of individuals and social learning of new technologies, Dene languages should not be expected to offer comparable evidence of ethnogenesis. Even with this lack of external linguistic evidence, the fact that Southern Dene dialects did not diverge into separate, mutually unintelligible languages (with the exception of Kiowa Apache, cf. Hoijer 1971), and that other Athapaskan languages from ethnically distinct regional groups form "a fascinatingly large and intricate dialect complex" (Snoek 2015:44), do suggest some tendency of Dene societies towards close contact and integration. Indeed, language today is the main vehicle for asserting Dene *as* a continent-spanning identity. But while observations of the phenomenon abound, it is difficult to find speculation on *why* this might be the case. Looking deeper into the mechanisms of Southern Dene ethnogenesis is a question anthropological and archaeological methods are uniquely well suited to answer.

The core principles of group identity formation reviewed here—*habitus* in Pierre Bourdieu's practice theory (Bourdieu 1977, 1984) or, in sociological terms, *positive distinction* in social identity theory (Tajfel et al. 1971; Turner et al. 1987)—ultimately describe ethnocentric processes of differentiation as individuals actively or subconsciously set their social groups apart from others. They suggest little motivation for people from different groups to exchange information, ally themselves, or engage in other cooperative behaviours that would promote ethnogenetic change. The *contact hypothesis*, originally proposed by psychologist Gordon Allport (1954), provides a useful unifying principle for defining conditions under which biases favouring the in-group can be overcome. Allport very simply proposed that positive social interaction between members of different groups can reduce intergroup prejudices that lead to avoidance and conflict, while negative social interaction is likely to greatly reinforce already salient group identities and hinder the formation of social ties (Paolini et al. 2010; Pettigrew and Tropp 2006), drawing attention to motivations for actively seeking out positive social interactions.

In terms of identifying culture-specific reasons for engaging in positive forms of contact (in the context of the caves, we may think in terms of gambling, feasting, and ceremony), Ives's (1990, 1998) work on kinship patterns among northern Dene groups provides some critical insight. Structural differences in the reckoning of cross-cousins as terminological siblings or affines result in effectively endogamous or exogamous marriage preferences, in turn affecting whether groups avoid other groups or seek them out for the purpose of alliances. Powerful social motivations can be found in the increased security offered by increased group size, leading some groups to be more inclined to overcome in-group biases and to seek interaction with neighbouring groups more often than others. These motivations extend to economic concerns: kinship ties across social boundaries are readily exploited for the purposes of gathering sufficient numbers of people to engage in labour-intensive communal hunting. The kinship patterns described by Ives (1990), and efforts to seek out positive versus negative social contact in general, have predicted outcomes that should be reflected in the archaeological record, and that mirror ethnogenetic versus phylogenetic processes.

The Formation of Group Identity

With the timing of the occupation of the Promontory Caves now resolved, it is clear that ancestral Southern Dene arriving in the eastern Great Basin did not enter into a cultural vacuum. As Julian Steward suspected, other groups—what he termed "Northern Periphery" or "Puebloid" but what are now understood to have been part of the Fremont sphere, were still present (Steward 1933; 1937*a*), although major cultural changes in the region co-occurred with the Promontory arrival. The stage was thus set for the type of historical circumstances to which Barbara Voss has suggested ethnogenetic "transformations in social identity" should be likely, "spurred by substantive demographic shifts—aggregation, disaggregation, displacement, and migration—combined with the emergence or imposition of new structures of power" (Voss 2015:665–56). If identities were indeed negotiated in a contact scenario, understanding how is dependent on the ways social identities are formed and maintained, and what evidence these processes might leave.

For Fremont and Promontory people alike, previously unmet groups—strangers—would represent both a risk and an opportunity, as rivals or, potentially, as partners. Prospects would have been highly uncertain between migrant and established groups: whether a newly arriving or already established group would be seen as a threat or ally, and the processes by which neighbouring peoples could progress from one categorization to the other, would play a role in what opportunities for social interaction were possible.

Social identity

When considering the organization of people into social groups and how those groups interact with each other, especially among hunter-gatherers, the most logical place to begin is the family. By virtue of birth, we find ourselves in our very first in-group, and through social learning, our network of trustworthy social connections gradually expands outward. I say social learning, though in the broadest sense, feelings of group solidarity are attributable to both nature and nurture: neurochemical aspects of kinship-linked cooperation in human groups are, for instance, linked to the role of the neuropeptide oxytocin in motivating in-group favouritism (Cikara and Van Bavel 2014; De Dreu et al. 2010, 2011; Stallen et al. 2012; Trumble et al. 2015). While fascinating, these likely operate at a universal level. It has long been argued by anthropologists that, even if rooted in biologically driven impulses, approaches to kinship reckoning, cooperation, and competition vary widely among human societies through socially constructed means (Benedict 1934; Malinowski 1922; Mead 1937:460), and the role of biological factors, as opposed to cultural ones, in determining the organization of human social groups is necessarily small (Sahlins 1976). Culturally and historically dependent contexts for kin and other in-group biases, the means by which competitive and cooperative behaviours are regulated by socially mediated values, and how these values can be subject to change over the course of an individual's lifetime are of interest here.

A commonly cited anthropological approach to understanding social relations through which activities like cooperation and competition take effect—particularly when addressing issues of ethnic identity—is Pierre Bourdieu's (1977, 1984) *practice theory*, in which people's feelings of group membership are the product of a subliminal awareness of shared social practice, or *habitus* (G. Bentley 1987, 1991; Hu 2013:374). Practice theory is vague on how and why these awarenesses of social practice emerge, attributing them as "subconscious." Some support for feelings of group cohesion can be found in neurobiology and neurochemistry, as noted above, though habitus is also explicitly a result of acculturation. Within the framework of Bourdieu's concept of habitus, not only do people gravitate to groups that are similar to themselves, but they actively work to distinguish themselves from others through practices such as cultural aesthetics that reinforce their distinctiveness (Bourdieu 1990:54). These efforts at *distinction* are accessible to archaeologists in the form of style, differences in which offer a methodological basis for interpreting social groups and classes (Bourdieu 1984; Hu 2013:375).

These principles were first put forward by sociologist Max Weber (1978 [1922]:390), who argued that in addition to a trend towards association with like individuals, people also avoid those with "perceptible differences in the conduct of everyday life." While Weber emphasized physiological differences of appearance, Bourdieu's practice theory refers to the manufactured symbols associated with group membership as mechanisms to forge solidarity with like individuals (effectively, an in-group), while simultaneously repelling non-members (an out-group). The same principle of members of social groups setting themselves apart from non-members has been posited to apply equally to linguistic diversification (Labov 1973; Livingstone 2002; Livingstone and Fyfe 1999; Nettle 1999; Nettle and Dunbar 1997; Richerson and Boyd 2010). Positive and negative association, so conceptualized, implies selective pressure that should cause social groups, once differentiated, to continually drift farther apart: effectively, they model a process of ever-increasing ethnocentricism. Bourdieu's concept of distinction is an operable justification for the study of emergent difference, or phylogenesis, but it offers little practical insight on what might bring individuals with different backgrounds together, or for social groups and their cultural expressions to ever coalesce.

While some other social mechanism than in-group bias is needed to explain ethnogenetic processes of culture change, if there is such thing as a universal when it comes to the rules of social organization, it is that a preference for one's own in-group manifests in virtually all human societies (D. Brown 1991). Some possible mechanisms are addressed in *social identity theory*, an area of social psychology that addresses "the role of self-conception in group membership, group processes, and intergroup relations" (Hogg 2006:111). The foundations of social identity theory lie in a series of experiments conducted in the 1970s and 1980s, in which social psychologist Henri Tajfel and colleagues attempted to define the minimal conditions under which intergroup discrimination—in-group favouritism and out-group disparagement—would occur (Tajfel 1970; Tajfel et al. 1971; Tajfel and Turner 1979). Under a wide range of experimental conditions, typically using resource allocation tasks, social identity studies have found even the most arbitrary group designations trigger actions by group members that favour their own in-group over out-groups. This does not necessarily mean outsiders are persecuted: discrimination against out-group members in test conditions is generally a matter of not giving them the same favourable treatment as the in-group rather than any genuine ill intent (Brewer 1979; B. Mullen et al. 1992).

Seeking to explain the tendency towards in-group favouritism, Tajfel and Turner (1979) initially postulated a process termed *positive distinction* wherein group members make choices to elevate the status of themselves relative to others. This finding echoed Bourdieu's practice theory, and the similarity was noted by Tajfel in his later work, though it was arrived at independently (Condor 1996:309). Positive distinction more expressly identifies a purpose behind group identity formation and maintenance processes than the vague, subliminal awarenesses embodied in the concept of habitus, however. Here, group members are suggested to actively promote their in-groups in the pursuit of status, echoing the conclusions of scholars such as Margaret Mead (1937) and Johan Huizinga (1950) on the function of interpersonal and intersocietal competition. In-group favouritism can be seen as the social basis for cooperation, while at the same time being an expressly collaborative form of competition against other groups.

Social identity theory, as elaborated by Tajfel (1974), transcends this binarism of in-group versus out-group, though, to also integrate intergroup behaviors and social beliefs with mechanisms for social identity change—at larger scales, speaking directly to ethnomorphic processes that can be linked to the birth of new identities. Five key social beliefs factor into how intergroup relations are negotiated:

> (1) beliefs about the social *status* of one's group relative to an out-group, (2) beliefs about how *stable* this status relationship is, (3) beliefs about how *legitimate* it is, (4) beliefs about how *permeable* the boundary is between one's own group and the out-group and therefore the possibility of psychologically passing from one group to the other, and (5) beliefs about whether an *alternative* status quo is conceivable and achievable. [Hogg 2006:122–123]

Competition is predicted when boundaries are viewed as impermeable and relative status is perceived as unstable enough for one group to supplant another (Tajfel and Turner 1979), but this is far from the only type of intergroup relationship possible. Hogg (2006:123) offers the example of a lower-status group that sees the status quo as both stable and legitimate, but considers boundaries between social groups to be permeable. Individuals within such groups are predicted to disidentify from their own group and, through a strategy of individual mobility, attempt to join the higher-status group. It is important to recognize the role of individual agency in such processes, and the role intentional shifts in personal identity can have that, if repeated on a larger scale, result in structural changes at larger demographic (i.e., group identity) levels. Ethnogenetic identity change is to a certain extent exogenous in these cases, predicted to be most common in groups that have undergone significant changes in organizational structure, resource levels, or size, and in which individuals compare their circumstances unfavourably to opportunities in other, more stable groups (Burke 2004; Stets 2006:104).

In addition to individual agency, mechanisms exist for internecine competition to be overcome through group-level integrative processes; such social recategorizations entail the formation of new, shared, superordinate in-group identities (Gaertner and Dovidio 2000; Hogg 2006:123). The salience of superordinate identities—tribal, polyethnic, even nationalistic—can be established and maintained through the identification of common purpose and goals while recognizing and respecting the distinctiveness of constituent entities and even incorporating each other's attributes as part of their own (S. Wright et al. 2002).

It is in these postulated processes of large-scale demographic change, either through the movement of individuals or the incorporation of groups within new, superordinate social identities, that we can begin to see parallels for the types of processes reviewed in the previous chapters, from the union of the Kiowa and the Kiowa Apache to the gathering of the Diné clans, and from which scenarios can be inferred in the archaeological record. Focusing on the timing and nature of the Fremont–Promontory, or Late Prehistoric, transition in the eastern Great Basin, a number of propositions can be offered on the negotiation of intergroup relations, rooted in the principles of the Archaeology of Human Experience (Hegmon 2016*a*, 2016*b*; Ortman 2016, etc.). First and foremost, differences in subsistence practices, and more importantly, in the comparative food yields of communal bison hunting versus opportunistic hunting and foraging by wetlands groups, would have constituted easily perceptible differences in resource wealth and, by extension, status. Perceptions of the stability of one strategy against the other can also be called into question, especially if the circumstances of Great Basin forager groups had substantively changed in living memory as a result of drought and the abandonment of maize horticulture. Questions of the legitimacy of one strategy or the other, and of their comparative status, are undoubtedly tied to the performative and redistributive aspects of ceremony, feasting, and exchange. The permeability of social boundaries, and of the acceptability of alternative ways of life, can be addressed in part by various methods of social recruitment, reasons for its taking place, the ensuing social standing of newcomers within their new groups. Collectively, these propositions strike to the core of what changes would have been possible, and what the experience of such change would have been like for those involved.

Contact, Alliance, and Ethnogenesis

Any negotiation of social relations in integrative ways requires that ethnocentric prejudices, a significant obstacle to intergroup cooperation, be overcome. Prejudicial biases favouring one's own ethnic identity tend to be quite persistent, however: people generally maintain strong attachments to their original groups (Prentice and Miller 1999). Quality of intergroup contact is a key to in determining whether such biases can be resolved. Gordon Allport's (1954) contact hypothesis stipulates that positive social interaction between out-group members is a necessary condition for reducing intergroup prejudices that lead to anxiety, avoidance, and conflict (Pettigrew and Tropp 2006). While negative intergroup contact is likely to greatly reinforce already salient group identities (Paolini et al. 2010), thus hindering the formation of social ties, cross-group friendships can arise even from minimal positive contact, play a causal role in reducing intergroup anxiety, and lead to the seeking out rather than avoidance of further interaction (MacInnis and Page-Gould 2015; Page-Gould et al. 2008).

In the context of ancestral Dene migration, and of contact between Promontory and Fremont peoples, there are two conspicuous reasons why positive contact would have been actively sought, and why it would have been in peoples' interests to overcome ethnocentric prejudices. First are the structural constraints of preferred marriage partners imposed by kinship systems, details of which, rather than being universal, are highly contingent on the cultural affiliation of specific groups. Second is the amount of labour involved in processing large numbers of bison and other large game, an inescapable economic reality of communal bison hunting societies in general. These powerful motivations for intergroup contact and social recruitment are reviewed in the following sections.

Kinship and social recruitment

In terms of identifying culture-specific reasons for engaging in positive forms of intergroup contact, Ives's (1990, 1998) work on how ideas about kinship shape attitudes towards group formation and social alliances provides some critical insight. Looking specifically at ethnographic Subarctic Dene examples, kinship structures traditionally privilege the marriage of cross-cousin in-laws while parallel cousins are considered blood relatives between whom marriage must be avoided (i.e., they are similar to Dravidian kinship systems; Asch 1980, 1998; Ives 1990; Trautmann 1981). Despite the common basis in Dravidian kinship terminology, actual group composition manifests in two distinct patterns based on group-specific principles about the "real, fictive or terminological primary kin ties" linking members of a community, rules about postmarital residence and the sibling cores around which groups are structured, and political motivations for "the formation of affinal alliances between and within groups" (Ives 1990:110–111; see also Ridington 1968, 1969; Rubel and Rosman 1983).

In one common pattern, newly married couples may reside with either spouse's family (i.e., bilocal postmarital residence), while social groups develop around opposite-sex sibling cores. In this configuration, groups of brothers and sisters marry other groups of brothers and sisters, and their offspring, bilateral cross-cousins, are considered ideal marriage partners, although marriage partners are sometimes found in other groups. Such groups tend to be agamous or endogamous and focus on retaining individuals of descendant generations, a pattern Ives (1990) has termed *Local Group Growth*.

The other distinct pattern of social organization identified by Ives involves a unilocal post-marital residence preference and social groups organized around same-sex sibling cores. In this arrangement, groups of sisters from one lineage are married to groups of brothers from another; offspring are effectively parallel cousins, and suitable marriage partners must be found elsewhere.

The resulting *Local Group Alliance* pattern is highly exogamous (Ives 1990:299–300).

These subtle distinctions in kinship reckoning have profound effects on other aspects of social organization. Among groups following the Local Group Growth pattern, the intersocietal endogamy practiced by peoples such as the Dane-zaa (Beaver) meant alliances, or even peaceful relations, were of little interest: "When Beaver intermarriage with [other] groups took place, it was usually the product of forceful acquisition of women" (Ives 1990:188). The skew towards endogamy in the Local Group Growth pattern minimizes the need for social and economic ties with other groups, and individuals' primary social contact is within the group. Such groups, if successful, can grow to considerable size, in part through an emphasis on retention of band members—senior men would actively exert their influence to keep sons and daughters within the group, and to recruit marriage partners for them from outside groups when none were already available within (Ives 1990:98; Ridington 1968). The drive to retain individuals and the efforts of older men to exert significant influence (often putting prominent figures at odds with each other) meant sociopolitical tensions between rivals would have been common (Ives 1990:110, 114). As a consequence, such groups frequently experience divisions of membership described by Michael Asch as "implosive" (personal communication cited in Ives 1990:100), leading to the formation of new group identities through essentially phylogenetic processes. In addition to internal struggles for political control between affines and consanguines, Dane-zaa myths graphically portray local groups being on hostile terms with other neighbouring groups and were subject to both social and economic isolation, however self-imposed (P. Goddard 1916:245–48; Ives 1990:194).

It is with the Local Group Alliance pattern that the need for positive contact with other social groups is pronounced. Speaking of the Dene Tha' (Slavey) of the Mackenzie River system, Wentzel (1889:92) reported: "They tell me they never began a war with any of their neighbours." Exogamous marriage precepts require group members to seek out and maintain friendly ties with others in order to exchange marriage partners, which in turn facilitates the development of additional economic and social ties. Groups following the Local Group Alliance pattern, as the name suggests, actively seek out alliances for the purposes of intermarriage through peaceful means, recruiting new members and pumping others out, and in the process forming networks of friendly social ties that span great geographic distances. Traveling along a vast stretch of Barren Grounds treeline with a powerful Caribou Eater (Denesułine) band led by Matonabee, Samuel Hearne (ca. 1769–72) noted their connections with nearly every group they came across. While peaceful interactions were the norm, they were not entirely universal, and the rare absence of affinal ties could have harsh consequences. The one socially isolated band Matonabee's group came across with whom they found they had no ties was plundered (J. Smith 1976:14).

Local group growth patterns rigidly enforce in-group favouritism and out-group avoidance: over the long-term, new social groups should emerge only through the fissioning of populations once they have become too large for the resource base and carrying capacity of their home regions, with efforts at positive distinction contributing to subsequent divergence of fissioned groups. Local group alliance patterns, meanwhile, force individuals to cross social boundaries and actively forge new relationships through processes that would require considerable positive intergroup contact, resulting in the emergence of new group identities through syncretic rather than divergent processes. Because all offspring of one gender are expected to relocate post-maritally, attrition of group members is more pronounced, though such prospects for limited growth or even extinction are mitigated somewhat by increased potential for mergers between groups. The constant flux of group membership coupled with a stochastic element to the gender of offspring can result in individual groups being relatively short-lived, while new group identities are constantly emerging through ethnogenetic processes.

All this is not to say that a simple binary of behaviours existed between exogamous and endogamous groups. Among the Denesułine at Deninu Kue (Fort Resolution), for instance, despite a preference for marriages at the heart of a local group between a brother and a sister with a brother and a sister (J. Smith 1978:79), which "sounds much like the Beaver notion of affinity" (Ives 1990:219) and would be expected to facilitate marriages between bilateral cross cousins in subsequent generations, community members nevertheless expressed a "deep aversion to marriages between individuals too closely related" (J. Smith 1978:79) and strongly adhered to principles of local group exogamy (Sharp 1979:56). Even in such alliance-type settings, hunting groups still competed over resources, mates, and social status, leaders actively tried to recruit as many individuals to their groups as possible, and accepting aid from others during times of scarcity signified a loss of prestige, owing to the implied superior power of their benefactors (Ives 1990:219; Sharp 1977:383, 388). A spectrum of possibilities was available to Northern Dene groups, and presumably to Proto-Southern Dene, that could facilitate both growth of the local group and alliance with an extensive network of affines.

The relationships between endogamy and phylogenetic group fissioning, and between exogamy and ethnogenetic blending, are applicable to virtually any kinship system. The logic of Dravidian kinship, however, not only forces very particular choices among Subarctic Dene between Local Group Growth and Local Group Alliance patterns but creates the latitude for flexibility between them. This choice of kinship structure is not a matter of happenstance or random variation; rather, the group formation principles involved could be highly intentional. The Ross River Kaska, for instance, would intermarry into dispersed, exogamous alliances when seeking to expand their political and economic influence, while they would enact endogamous, bilateral cross-cousin marriages when the continuity of the local group was a priority (Ives 1990:277–78; McDonnell 1975).

This can be seen as an informed choice in response to different types of uncertainty, reflecting differing tolerances for very specific types of risk. The difference between these two kinship strategies represents

> a profound choice in Northern Athapaskan life. To be endogamous is to abrogate the possibility of alliance, to go it alone, to remain largely strangers to others. To be exogamous is to break down these barriers, to establish cooperative external relationships, to unite once again people from the peripheries of the social universe. [Ives 1990:330]

The highly self-reliant Local Group Growth pattern (and endogamy in general) connotes a high degree of confidence in the capacity of one's own group to thrive, but also suggests a low esteem for, and perhaps trust in, other social groups. The highly interdependent Local Group Alliance pattern (and, more broadly, exogamy), in contrast, invests heavily in social relations, in part in anticipation of uncertainty in the natural environment. In the Subarctic, self-reliance has its benefits: when resources such as game are limited, populations densities are low, and social groups are widely distributed across the landscape, close contact with neighbouring groups could be seen as a pathway to competition and conflict. But they are also highly vulnerable should environmental conditions suddenly change. "The creation of alliances ties over great geographic areas, providing a support network to counter the vicissitudes of boreal forest resource fluctuations" (Ives 1998:125), but

> *intergenerational* cycles of alliance cannot arise or be maintained over most of the Subarctic (or, for that matter, much of the Great Basin and Plains regions). Identifiable co-residential groups in these settings are highly fluid—in a number of cases, they are virtually programmed to disappear within a generation or two, and necessarily so. Longer cycles of exchange simply are not feasible under these circumstances. [Ives 1998:135, emphasis added]

The immigration process undergone by Proto-Southern Dene ancestors would involve a great deal of uncertainty about new environments, and success would to some degree be predicated to a greater degree on the social contacts that could be established along the way.

The reasoning that alliance-seeking groups *should not persist* is borne out in many Spanish historic accounts with named groups (most notably the Palomas, but also the Carlanas, Cuartelejos, Faraones, Gileños, and many others) coming into mention, forming alliances with others, and then presumably dissolving into them over time. Southern Dene groups in the Southwest actively sought to maintain contact with neighbouring groups, strategically placing themselves within 100 miles of other groups (especially horticultural settlements) precisely for the purpose of intermarriage and alliance (Eiselt 2012:57–58). One effect of these alliances was the emergence of an interdependence with the new neighbouring populations. Sunday Eiselt has suggested that "social networks… generated a certain 'pull' effect as Apachean populations shifted in range to maintain contact with each other and with horticultural populations that were in the process of resettling in better farming locations during the Medieval Climate Anomaly" (Eiselt 2012:58).

While Eiselt was referring specifically to the cultural exchange between Ndee and Puebloan communities, implications of this pattern for Proto-Southern Dene in the archaeological record, including the cultural setting of the Great Salt Lake area in the 13th century, require careful consideration. First, if the Promontory people were an alliance-seeking group, they would have actively sought to position themselves within proximity of neighbouring groups. Close geographic proximity of contemporary Fremont peoples should be expected, with pre-equestrian peoples presumably residing closer than the 100 miles noted by Eiselt (2012:57). Conversely, people following the Local Group Growth pattern would more likely seek out a comparatively isolated area, perhaps more in accord with the cultural replacement hypothesis for Promontory origins in which Fremont peoples had already abandoned the eastern Great Basin. Second, the archaeological signature of an alliance-seeking group would be short-lived: given the highly fluid nature of group membership, the Promontory Phase as seen at the cave would not be expected to exactly correspond with earlier or later manifestations, except in the broadest terms. Intermarriage and changing group composition might be one reason for significant differences in the material culture of the Promontory Caves and Promontory-affiliated sites in the Utah Valley, and might also partly account for why precursor populations have been archaeologically difficult to detect. Finally, if Promontory groups entered into interdependent alliances with Fremont ones, the Ndee example noted by Eiselt (2012) would indicate that their fates would have become intertwined as result: if Fremont people were themselves in a state of flux and were in the process of relocating to better locales, their Promontory allies would be expected to have followed. It is less certain whether Fremont groups would have been as similarly dependent on alliances, but the possibility that they also came to follow the movements of their Promontory allies cannot be excluded.

In sum, Eiselt (2012:41) has gone so far as to suggest that Northern Dene groups could not "achieve their migration without the benefit of alliance, marriage, and trade with neighboring groups." It is somewhat surprising, then, that despite the preponderance of evidence indicating that Southern Dene followed the Local Group Alliance pattern, reconstructed kin terms show that the founding Proto-Southern Dene population left the Subarctic practicing bilateral cross-cousin marriage, the defining attribute of endogamous Local Group Growth among Subarctic Dene (Dyen and Aberle 1974:230–231).

Only later did a preference for exogamous marriage partners emerge, the transition likely occurring after continued interaction with groups such as the Blackfoot on the Northern Plains (Ives 2010; Ives et al. 2002). Though the specific timing remains uncertain, "the daughter Apachean systems all shifted in directions that required local group exogamy. This would, of course, have opened Apachean communities outward, very much in accord with the genetic, oral tradition and material culture indications that there were important influxes of neighboring peoples entering early Apachean society" (Ives 2010:330; Malhi et al. 2003). Thus, two stages to Southern Dene expansion can be identified on the basis of kinship systems alone. At the onset, a small, endogamous founding population would have undergone periodic fissioning events as unresolvable differences between competing group members emerged, giving rise to a number of closely related and highly similar, but ideologically distinct Proto-Southern Dene groups. Later, these groups underwent terminological shifts to express varying expressions of a preference for exogamy, experiencing growth through the formation of alliances and the extensive recruitment of non-Dene people, especially women. The material and ceremonial culture of neighbouring groups would have been adopted by Proto-Southern Dene as a result of such positive social contact, especially once they arrived in new and unfamiliar regions (Ives 1990:114, 2010:326).

While the demands set by kinship structure among hunter-gatherer groups suggest one powerful motivation for some groups to be more inclined to overcome in-group biases and to seek interaction with neighbouring groups more often than others, the unpredictable nature of resource yields is not the only possible explanation for the latitude to shift between Local Group Growth and Local Group Alliance patterns. As discussed in the following section, the need for human resources in communal hunting activities might also play a deterministic role in the kinship structure of exogamous Dene groups and can be seen to force alliance-seeking behaviours across a broad spectrum of Plains-based peoples, providing another strong motivation for out-group contact in its own right.

Subsistence and social recruitment

More than simply providing a safety net in case of resource scarcity, the kinship patterns discussed above are also linked to specific subsistence economies. Dominant male figures in groups following the Local Group Growth model—most notably, the Dane-zaa—hunted individually or in small parties, demonstrating their skill and personal power through the successful capture of game (Ridington 1968, 1969). Such highly competitive, individualistic hunting for the purposes of status enhancement, in which having a surplus of resources to distribute leads to different treatment by other community members, including prospective marriage partners, is known as *prestige hunting* (Hawkes 1990, 1991, 1993; Kaplan and Hill 1985; K. McGuire and Hildebrandt 2005:698). Hunting among Subarctic Dene following the Local Group Alliance model—among them the Dene Tha', Denesułine, and Tłįchǫ—often tended to be more cooperative than individualistic. Although groups enacted a number of different strategies to take advantage of locally available resources at different times of the year, many positioned themselves at the edges of the tundra to intercept enormous caribou herds en route to and from their winter breeding grounds in the boreal forest (Ives 1990:316). While this aspect of land tenure does not account for the subsistence of all Mackenzie Valley Dene, it is a highly conspicuous difference between exogamous and endogamous groups: exogamously affiliated allies could readily be called upon to amass the requisite numbers of laborers to orchestrate and process large-scale, communal hunts, an option that was generally not available to local groups that practiced endogamy to a significant degree (Ives 1990:304). In addition to temporary gatherings, successful local groups involved in communal hunting would be expected to have an accretional character, with sets of siblings (effectively, local group cores in their own right) coming into the fold after an initial marriage between the groups had taken place, as among the Tłı̨chǫ community at Whatì (Helm 1965; Ives 1990:310).

There are several other facets to the apparent economic function of local group exogamous marriages. Local group through recruitment of members is a prevalent theme, but the temporary relocation of individuals outside the local group through bride service—a male serving as a hunter in the group of his wife's parents for a period of time—could have additional benefits. Among the Southern Tutchone, "A man who married outside his natal local group gained access to and knowledge of another hunting territory…. At least some local groups may have deliberately pursued this strategy in accordance with a rationale stressing the expansion of exploitative range" (Ives 1990:289; McClellan 1975). Associated with this is a "priority of first use," in which local groups tend to defer to those already exploiting a locality (Ives 1990:271). Group alliances would have been the essential means of peacefully gaining access to territory currently occupied by others. As noted in the example from Hearne (1795), intermarriage provided the critical means of mediating inevitable intergroup tensions: without affinal links, sustained proximity would simply have been untenable (Sharp 1977:387). Affinal ties created obligations of reciprocity that facilitated redistribution of goods and resources (see Chapter 6). And also, especially through bride service, individuals gained familiarity with new geographic areas, a key to territorial expansion or relocation, while marriage ties were the key to population growth, not just through the birth of children, but through the accretion of kindred casting their lot with their most successful relatives (Ives 1990:219; J. Smith 1978:84–85).

It might seem that exogamous, communally hunting Northern Dene groups would have been pre-adapted for the transition to a southward migration onto the Plains. However, it was, as previously noted, most likely an endogamous group observing bilateral crossness that initially moved south (Dyen and Aberle 1974). This may suggest that both Dene of the central Subarctic and southward-moving groups experienced similar pressures that prompted groups to restructure Dravidian kin terminologies and prioritize out-group alliances through exogamous intermarriage. In both cases, even once fully exogamous, "the issues of reckoning crossness and bilateral cross cousin marriage never lurk terribly far beneath the surface for many local group alliance societies" (Ives 1990: 350–51), be it the Kiowa Apache (Dyen and Aberle 1974:200) or Caribou-Eater Denesułine groups (J. Smith 1978:79–80). Because available genetic evidence for peoples such as the Tłįchǫ do not indicate extensive intermarriage with non-Dene groups (Torroni et al. 1992; Lorenz and Smith 1996; Table 3.1), it is unclear that alliance-seeking for the purposes of expansion into other groups' territory played a significant a factor in kin terminology shifts in the central Subarctic. Though intermarriage for the purposes of territorial rights was likely a factor in the southward Dene migration, the functional utility of alliances for communal hunting activities appears more definitively as a common thread between southern and northern decisions about the implementation of exogamous marriage rules.

In the Subarctic, the contrast between growth and continuity through endogamy or alliance and eventual dissolution through exogamy has been characterized as a fundamental choice in Mackenzie Valley systems (Ives 1990:330). I would submit that a transition to communal bison hunting on the Plains effectively removes the choice. While even a single bison represents a windfall compared to the yield from other game animals (see Chapter 2), it also requires a commensurate investment of labour. The complexity, scale, and peril involved in a coordinated bison kill, then, cannot be understated. Entire herds were targeted in a single hunt, with even a slight mistake or stroke of bad luck could cause the stampeding animals to veer off course, ruining the enterprise, potentially with lethal consequences (Brink 2008:131, 158). Once successfully entrapped in a pound or driven over a ledge, not one bison could be allowed to survive, for fear that it would alert its compatriots to the trickery employed by its hunters (Thomas Woolsey and Alexander Henry, cited in Brink 2008:157). This commitment to complete kills required considerable numbers of men and women in various roles, from ceremonial hunting leaders engaged in spiritually summoning bison to the hunt to those hunters physically involved in directing bison towards drive lanes through tact and guile, startling the herd to initiate a stampede, staffing drive lanes to keep bison from straying off course, and targeting them with projectiles or administering killing blows at the terminus, be it a jump site or impoundment. Meat would need to be stripped from a carcass and prepared for drying (by cutting into thin strips) before it rotted, with additional labour invested in hide cleaning, marrow and bone grease extraction, and the fashioning of tools, clothing, and other implements from bone, hair, hide, and horn.

As with intercepts of migrating caribou herds on the fringes of the barren grounds, the effort of a concerted bison kill was beyond an individual family, and indeed may have exceeded the capacity of some local groups. In the largest kill events, multiple groups that did not ordinarily reside together would need to unite their efforts in pursuit of this single purpose, generating enough food from the event to sustain a large population, as well as pack animals—meat-consuming dogs in the pre-contact era, for a period of time. "[T]he very ability to develop large bison hunting camps, especially in fall and winter" (Colpitts 2015:423) was dependent on the capacity of bison-hunting groups to maintain alliances with neighbouring groups and to incorporate outsiders. Open and porous kinship networks provided the key to these patterns of alliance: intergroup conflicts could be mitigated against and sufficient numbers provided for cooperative endeavours, often manifesting in the long term on the Plains as intermarried bands with mixed ethnicities (Berndt 2008:42–45; Binnema 2001:13; Colpitts 2015:423; Innes 2013:60–61, 70–72). Bison hunters could not succeed without exogamy, an observation that applies not just to migrating Proto-Southern Dene, but to any group that took up bison hunting on the Plains. A focus on group recruitment and alliance seeking, indistinguishable from the Local Group Alliance pattern, characterizes virtually any Plains bison hunting people. The universal adoption of kin terminology promoting exogamy among Southern Dene groups may well be seen as an attestation not just of interaction with groups such as the Blackfoot (Ives 2010; Ives et al. 2002), but an imperative of adopting a bison-dependent economy.

The logic of communal bison hunting as a uniquely challenging prospect has significant implications for understanding the social processes involved in the Late Prehistoric transition, and not just of the Promontory Culture, but of Great Salt Lake Fremont occupations where bison hunting is in evidence for a period of time, most likely in the 13th and 14th centuries (Tables 2.2, 2.3). Consideration of not just the demographic requirements for communal bison hunting, but the highly specialized knowledge involved, exposes the fallacy behind the suggestion that Fremont peoples could have engaged in the practice as a routine aspect of their otherwise well attested variation (cf. Madsen and Simms 1998): one did not simply become a communal bison hunter. In Plains-based societies, an elaborate ceremonial complex is associated with communal hunting, and the spiritual sanction associated with conceiving, planning, and executing a hunt should not be overlooked when addressing the elaboration of bison hunting in the Great Basin. That bison only seem to have been hunted in great numbers for a brief period, though they represent a higher-yielding food source than any other game of the region, stands in contradiction to cultural ecological models which focus on the optimization of resources on the landscape. In addressing the cultural choice to pursue communal bison hunting, Gerald Oetelaar (2014) has emphasized the agency of individual actors possessing different worldviews from those described in such models. Drawing from the example of the Blackfoot, perceptions of the relationship between humans and animals, and of alliances with spiritual entities that control the availability of resources, figure prominently in the reciprocal obligations relating to “the establishment, repeated use, maintenance, and spiritual attachment to important places such as bison jumps,” and of associated practices such as controlled burning in catchment areas, construction of drive lanes, preparation of processing areas, and marshaling the efforts of multiple groups (Oetelaar 2014:11). The amount of transferred, proprietary, and at times sacred knowledge involved in orchestrating a communal hunting event illustrates the impracticality of switching to mass bison hunting, even if large numbers of bison were available.

Consistently low numbers of bison remains, or their outright absence, at settlements around the Great Salt Lake during much of the Fremont era indicate that people did not know how to effectively harvest bison. From the perspective of wetlands foragers accustomed to opportunistic hunting of individual animals, the ability of the Promontory people to undertake a mass bison kill would have been a demonstration of spiritual sanction and significant personal power, and a tremendously alluring prospect. That is not to say that Fremont people could not have become bison hunters, but such a process would rely on the particular mechanics of alliance and intermarriage, in part motivated by a desire to expand not a geographic range, but an exploitative knowledge. Integral to patterns of intergroup cooperation negotiated by Plains bison hunters through open kinship ties was a readiness "to share rituals with one another, usually in geographic points of great spiritual meaning or within landscapes that figured prominently in their oral cultures" (Colpitts 2015:423). Such knowledge was most certainly accessible, under the right conditions, but only after it was obtained would the Fremont have been communal bison hunters.

If the reasons for pursuing bison hunting privilege the role of ceremonialists and hunters, in terms of individual labor, the work of a bison kill fell primarily to the women in a group. It is here that the demographic requirements of communal bison hunting are especially pronounced. A single bison hide alone, not counting meat preparation, could take as much as 70 hours to process. Ethnographic and historical accounts of bison processing show a woman could process only about a dozen hides in a season, far fewer than a skilled hunter could kill in that time, while processing times diminished rapidly when multiple women engaged in processing tasks together (Habicht-Mauche 2012:392; Jablow 1950). To accommodate these needs for human resources, Judith Habicht-Mauche (2008, 2012:392) has characterized the social recruitment that might have been undertaken by bison-hunting groups as more than negotiation of interethnic alliances: recruitment, too, could include intensification of polygyny (implying a unilateral movement of marriage partners) and incorporation of captives as slaves or low-status “chore wives,” as well as patronage of refugee individuals, families, or groups escaping social or demographic upheaval elsewhere (comparable to the accretional aspects of successful local groups noted in Subarctic settings).

A parallel might be seen between social conditions of the Protohistoric period on the Plains–Pueblo frontier, when interregional contact and trade went through a pronounced intensification (Baugh 1982, 1986; Habicht-Mauche 2005, 2008, 2012; Spielmann 1982, 1991; Vehik 2002), and big game hunter–wetland forager interactions at Promontory Cave 1. From a political economy perspective, the resource specializations of neighbouring groups in the Southwest resulted in region-specific divisions of labour and economic ties that, while mutually dependent, formed a coherent interregional economic system (Baugh 1982, 1986). Members of groups on either side of this dynamic would have sought to buffer against environmental, demographic, and social instability. In the case of trade between horticulturalists of the Rio Grande Valley and bison hunters from the Southern Plains, alliance forming and trade could have served as a social solution to resource unpredictability (Spielmann 1982, 1991). Certainly feasting could represent attempts to establish such long-term relations built around reciprocity in times of need.

The considerable imbalance of resource wealth between bison hunters and wetlands foragers, as contemporary strategies (see Chapters 2 and 5), suggests an alternate interpretation that may have been aimed at exploiting this disparity. Susan Vehik (2002) has argued that political leaders—competitive males in bison-hunting societies—sought to take advantage of social disruptions wrought by their neighbours' resource uncertainty in the pursuit of the enhancement of their own prestige. Trade would serve to fulfill these objectives to some extent, but group recruitment would serve a more pressing need, allowing what Habicht-Mauche (2012:390) has referred to as "ambitious men" to accrue resources needed for prestige-building exchanges by directing the labour of recruited group members, and possibly coopting their production.

Noting the relatively unilateral and accretional characteristics of communal bison hunting groups, Habicht-Mauche's (2012) feminist critique of the Plains bison-hunting economy describes the production of ever-increasing numbers of women as being appropriated by men in pursuit of their own status enhancement. The competitive pursuit of status enhancement is hardly restricted to communal hunting societies alone, though, and may in fact be mitigated somewhat by the cooperative pressures inherent to a bison-hunting lifestyle, which necessitated the maintenance of group size, exogamous kinship patterns, and alliance-seeking behaviours. The somewhat disparaging view offered by Habicht-Mauche is difficult to reconcile with accounts of the personal attainment of prestige by men and women alike in communal bison-hunting economies (cf. Flannery and Cooper 1946; see Chapter 6) and the accretional character of successful local groups in the Subarctic (cf. Ives 1990), both of which may be seen as part of a package of outcomes that tied into the critical mass needed for survival. Evident disparities in status may simply be a byproduct of the greater resource yields offered by communal hunting, and from which increased status differentiation could arise. In the prestige hunting model, the differential treatment that increased status brings, including by prospective marriage partners, is very much the point, and the agency of women in this process should not be overlooked. Successful bison hunters may well have been seen as attractive to women who controlled their own destinies by effectively voting with their feet.

It is fair to question the social standing and quality of life of the individual women who were recruited into such societies as second wives in polygynous relationships, or especially as slaves or chore wives. The conclusion that inequities in the division of labour likely existed, both between men and women and between women of differently ranked status, is inescapable. It is not necessarily the case, however, that a person's status under such circumstances was either static or permanent. From the vantage of lived human experience, weighed against relatively unreliable small-scale hunting and gathering (in which the precepts of male-dominated prestige hunting would likely also have been in effect) and in an era when horticulture may not have been viewed as viable, men and women alike may have considered participation in a bison-hunting economy, even at the cost of temporarily diminished social standing, to have been more appealing than the alternative.

Archaeological Implications

It has been suggested here that both kinship structure and subsistence strategy can play a deterministic role in motivating positive intergroup contact and alliance-seeking behaviour, and in overcoming strong in-group biases. There are significant parallels, too, between decisions about pursuing endogamous or exogamous patterns of intermarriage and the economic demands imposed by individualistic versus communal hunting.

These matters come to the fore in that the Local Group Growth and Local Group Alliance patterns described by Ives (1990), and efforts to seek out positive versus negative social contact in general, have predicted outcomes that should be reflected in the archaeological record, and that mirror phylogenetic versus ethnogenetic change. Assemblages left by groups following the Local Group Growth pattern should show very little influence from outsiders. Differentiation should be strictly maintained between groups with limited contact, and assemblages should reflect strong differences of identity. Conversely, the Local Group Alliance pattern should demonstrate more porous social boundaries as members of different groups freely moved between them, and as the social identities of groups became more complex.

Ives has identified three areas in particular where differences could be identifiable, at least within the hunting and gathering economies of northern Dene peoples: 1) the degree of regularity with which communal hunting could be undertaken, 2) the persistence of multi-generational occupations, and 3) the amount of stylistic variability associated with face-to-face intergroup contact. In terms of the first area of difference, sedentism associated with big game hunting, groups following the Local Group Growth pattern should only sporadically rely on high-yield communal hunting, as large groups should quickly fission into smaller ones to more effectively utilize the breadth of resources available in the marriage isolate's home region. The Local Group Alliance model should exhibit "increasing duration of seasonal gatherings of local groups at strategic hunting locations. Because this means of forming groups is founded on more extensive external alliances, episodes of communal hunting ought to be conducted more regularly" (Ives 1998:120–21). The archaeological signal of the local-group growth pattern should also be expected to be more enduring, with endogamous marriage helping sustain a single group's existence over multiple generations, resulting in a more sustained occupancy on a given landscape. Local-group alliances have greater potential, through attrition of their membership, to dissolve themselves into other groups, a phenomenon which can take place “in the course of a single generation and leave portions of the landscape unoccupied” (Ives 1998:121). Both these points are directly applicable to interpretation of the occupation of the Promontory Caves. In ongoing analyses, it is increasingly evident that occupations were of sustained duration and, judging from the sheer volume of highly laminated deposits over a short period of time, of great frequency (Yanicki and Ives 2017:142–44), in accord with the communal hunting episodes expected of alliance-making groups.

A remarkable record of repeated bison hunting Ives (1990:326–28) drew upon as an illustration of the predicted difference between the Local Group Growth and Local Group Alliance hunting patterns is the Vore site in Wyoming’s Black Hills—a site, incidentally, attributed to the Protohistoric Kiowa and Kiowa Apache in its later occupations (Reher and Frison 1980). There, deposition of faunal remains in varved pond sediment showed the periodicity of hunting events with seasonal accuracy, allowing the time elapsed between hunting events and their relative intensity to be calculated. For much of the 1500s and 1600s, hunts at the Vore site occurred “only about two or three times in a man’s lifetime,” while in the late 17th and early 18th centuries, bison herds were hunted almost continuously (Reher and Frison 1980:59). The initial irregularity, contrasted with later intensification, at first falls short of and then exceeds the frequency of hunts that Reher and Frison predicted for herd size fluctuations based on decadal rainfall and grazing cycles alone (Fawcett 1987). They were, William Fawcett argued, instead likely dictated by social and political concerns—the demands of groups to mediate tensions through acts of feasting, ceremony, and exchange. Ives (1990:328) noted that the infrequent initial hunting corresponds with the predicted intensity of groups lacking a regional alliance network and dependent on their own growth to carry out communal hunts as their numbers rose and fell. The more frequent record of later site use fits the expected pattern for linkages of smaller groups drawing on an alliance network and utilizing the site as often as economically viable to do so.

The brief duration of the Promontory Culture as seen at the caves, and substantive differences with other Promontory-affiliated occupations in Utah Valley, further attest to the intergenerational changes expected of the Local Group Alliance pattern. In addition to these macroscale differences in site and landscape occupation patterns, Ives has noted differences that should be evident at the level of individual artifact assemblages:

> Archaeologists generally assume that face-to-face contact between individuals has a direct bearing on the transmission of the stylistic variability seen in artifacts. Here again, the two alternatives differ. The circulation of people within and between regional marriage isolates in a local-group growth setting will be inherently more limited. One would therefore expect such settings to yield enclaves in which artifact styles reflect a greater degree of isolation and there is a greater chance for "drift" to affect artifact styles. Because they characteristically circulate individuals more widely, local-group alliance systems should produce greater stylistic homogeneity across a regional mamage isolate, and perhaps beyond [Ives 1998:121].

Focusing on the stylistic variability inherent to single assemblages and to groups of assemblages, Ives has offered a means of archaeologically distinguishing between groups practicing Local Group Growth and Local Group Alliance strategies. On the one hand, we are challenged to identify examples of rigid stylistic isolation and progressive differentiation resulting from fissioning events, and on the other, stylistic homogeneity across a region as evidence of social contact. These patterns, though, can also be seen as the product of a remarkable consilience of behaviours.

Local Group Growth, with its inclinations towards agamy or endogamy, is an exceptional form of in-group favouritism that not just allows but encourages avoidance of out-group contact. The exogamy strongly advocated by the Local Group Alliance strategy demonstrates the flexibility of in-group identity labels, providing an impetus to actively seek out-group contact, leading to the beneficial extension of positive distinction to an ever-expanding social network. Dene kinship terminology thus is an excellent example of a proximate mechanism for phenomena like in-group favouritism and out-group discrimination. The contrasting approaches to identification of marriage partners determines intergroup interactions that are not so much exclusive opposites as variations on a continuum of social relations varying between independence and interdependence, competition and cooperation. While Ives (1990) noted that individual Dene groups could often operationalize these principles in "multidimensional" ways, the two poles of Dene social organization are an extraordinary illustration of the flexibility of kinship systems, mirroring the fluidity inherent in social identity.

These patterns are not limited to Northern Dene groups that operated within Dravidian kinship structures, nor to Proto-Southern Dene peoples that took up communal bison hunting. Ives (1998) has drawn attention to comparable, flexible negotiations of kinship structure among Shoshonean and other groups when different objectives of primarily endogamous or exogamous ties are desired. Colpitts (2015) has meanwhile argued that a polyethnic character is an almost inevitable outcome for any group that engaged in communal bison hunting. It is enlightening to consider the universal shifts among early Southern Dene groups towards exogamous patterns of kinship reckoning and genetic evidence for Proto-Southern Dene social recruitment in this light. The compelling case for Proto-Southern Dene links to the Promontory people, coupled with the widespread cultural changes that accompanied intensified bison procurement in association with Promontory-affiliated assemblages, provide ample reason for examining the role of positive intergroup contact in the Late Prehistoric transition of the eastern Great Basin.

These expected patterns can be used to show the difference between *in situ* development of divergent cultural identities, or of contact between two or more. They may provide us with corollary insight into whether intergroup contact was desirable, and by extension, whether social groups were inclined towards cooperative social engagement in which the forging of ties and acquisition of marriage partners likely played an important role. By examining the mixing of cultural markers between groups, we might also expect to obtain insight into the groups' relative status, their stability, their presumed legitimacy, the permeability of boundaries, and beliefs about whether alternatives to the *status quo* were possible (cf. Hogg 2006:122–23; Tajfel 1974). In the context of the Late Prehistoric transition of the eastern Great Basin, this constitutes a much richer understanding not just of when and where significant cultural shifts took place, but how and perhaps, from the perspective of participants in the Promontory and Fremont cultural systems, why.

Detecting Identity Change

The preceding discussion has dwelt upon how positive social contact, motivations for it rooted in kinship structure and the economics of subsistence, and accompanying preferences for alliance seeking and intermarriage can lead to ethnogenetic change. Several questions remain about how such processes can be archaeologically detected. The following sections address what constitutes meaningful change in social identity (or ethnomorphosis) as expressed through material culture, whether it is possible to differentiate assemblages representing interaction through trade versus the exchange of ideas or the movement of people, and how archaeological assemblages can be identified as representing ethnically homogenous or heterogenous groups.

In the final section of this chapter, this discussion is synthesized as a model defining a continuum of behaviours ranging between positive and negative contact and their concomitant social and material outcomes. This model is presented here with the aim of outlining the testability of the hypothesis that the archaeological Promontory Culture emerged through the interaction between migratory bison hunters, ultimately of Subarctic Dene origin, and Fremont populations of the eastern Great Basin and Colorado Plateau. Despite the narrow scope explored here, the tenets of the social basis for distinction between fundamentally ethnogenetic and phylogenetic processes of cultural change described in this model are of broad enough applicability to be of use in a great many other scenarios.

Typology and its limitations

The determination of the cultural affiliation of archaeological assemblages is commonly accomplished through the identification of diagnostic material types, deemed representative of particular prehistoric groups, or cultures. When put into practice, however, typology and the weight given to cultural interpretations based on typological assessments can be highly problematic. While spatial and chronological distributions of artifact types do exist, the act of observing them does not explain the underlying cultural processes behind their creation (O'Connell et al. 1982:230). It is vital not to uncritically assert a correspondence between material culture and linguistic or ethnic groupings.

Foremost among the challenges to typological analyses is the assumption that material types are representative of the self-held identities of individual groups. The issue is more pronounced in some artifact classes than others, with projectile point types being a particularly egregious example. Highly visible in the archaeological record, readily observed projectile point variants can occur across vast distances and in regions which would have required significantly different sociocultural adaptations. If the advantage conferred by an innovative technology was believed to be useful, is reasonable to expect knowledge of it would be widespread. In other words, they often reflect what Willey and Phillips (1958:33) referred to as *horizons*:

> a primarily spatial continuity represented by cultural traits and assemblages whose nature and mode of occurrence permit the assumption of a broad and rapid spread. The archaeological units linked by a horizon are thus assumed to be approximately contemporaneous.

Even within constrained geographic regions like the Great Basin, the same projectile point types were almost certainly made by different ethnic groups (K. Jones 1994:73; Simms 1994:77).

This is not to say that *all* artifact classes transcend ethnic boundaries. A study of arrows ethnographically collected from Numic groups in the 1800s (Sinopoli 1991) found that "the stone points affixed to arrows contain virtually no stylistic relevance" and "mark no cultural boundaries" (Simms 1994:77; cf. Weissner 1983), but the same cannot be said for other elements of the arrows themselves.

> [A]rrow shaft decorations (generally unavailable to archaeologists) *are* relevant for marking distinctions between groups. Shaft decoration varies the most among closely interacting groups, counter to the tendency of archaeologists to interpret stylistic boundaries as marking substantially different groups.... [T]he more distant or different the group, the less distinctive

> in arrow shaft decorations. This makes sense given that the need to mark boundaries is likely to be greatest among people who have some association. [Simms 1994:77; emphasis added]

Beyond simply marking boundaries, the observation of greatest stylistic variability between groups in closest contact is a predicted outcome of processes of in-group distinction addressed in both social identity theory and practice theory.

Aspects of apparel and personal adornment stand out as strong candidates for signifying group membership and ethnic identity. The insights of William Philo Clark about the social information encoded in moccasin styles resonate strongly in this regard: "In former times, the moccasins of the different tribes were made so differently that for an Indian to see the moccasin was to know the tribe" (W. Clark 1885:257; see discussion in Chapter 2). This observation is notably reflected in Ian Hodder's (1982) seminal discussion of how stylistic distinction plays out in ethnographic settings, focusing on symbolism in material culture among societies of the Lake Baringo area in Kenya's Rift Valley. As with moccasins, items of both male and female apparel are rigidly enforced as markers of tribal conformity and ethnic identity (Hodder 1982:69). Meanwhile, in a situation reminiscent of the uniformity of projectile point styles in much of North America, "spear types are similar over wide areas when other things are very different between tribes" and are of "little value" in interpreting "between-group interaction" (Hodder 1982:68).

In these remarks lurks the spectre of distinction, though extant in material culture, not necessarily being preserved in the non-perishable products of hunter-gatherers. In response to this concern, Hodder's notes on calabash storage containers of the Baringo area are of special note as one of the few artifact classes in the region to feature extensive decoration, marked by women with distinctive patterns that, while often "common and widespread in distribution, [sometimes] show marked localisations" (Hodder 1982:68). They offer a useful source of analogy when considering other types of women's craft production such as pottery in the Great Basin and surrounding regions:

> The spatial patterning [of decorative motifs] is not clearly related to social boundaries on the tribal scale. There is greater localization in these calabash distributions than in many other artifact categories, and there is variation within tribes. These calabash distributions relate to the local community contacts and relationships of women. Designs are copied between women within small neighbourhoods and settlement clusters which sometimes cut across tribal boundaries. Designs are copied between families as much as within families. Thus, decorative style distributions of calabashes play a part in local dependencies and relationships rather than tribal-wide identities. [Hodder 1982:68]

While ethnographic analogy spanning continents is admittedly reaching, Hodder's observations are nevertheless compelling. Despite dominant male figures limiting and controlling women's roles in Baringo societies, a lack of male interest in calabash decoration allows women to use it as a "medium for silent discourse," expressing their own family affiliations and "ties of marriage and birth" irrespective of the tribal boundaries enforced by men (Hodder 1982:68–69). Such decoration reflects the movement of women across tribal boundaries, for instance through intermarriage, and highlights the persistence of multiple salient identities among different members of the population reflecting their unique life histories (cf. Hogg 2006:123). Furthermore, and once again reflecting principles of in-group distinction, greater emphasis on the execution and extent of distinctive decoration can be seen among minority groups surrounded by hostile neighbours, who are thus most concerned with maintenance and expression of their distinct identities (Hodder 1982:69–72).

We are urged, then, to consider women's craft production in the expression of identities shared by groups through the movement of individuals across social boundaries, a key demographic element of ethnogenetic processes, while also being alerted to the potential of stylistic distinction to inform us about the quality of relations with neighbouring groups. In spite of its limitiations, typology is not necessarily a futile endeavor. As noted by Kevin Jones (1994:71), "The prehistoric cultures we identify [from typological markers] are not cultures in any complete sense—they are classificatory shorthand for groups of similar kinds of archaeological remains in spatial and temporal proximity." To this can be added that some artifact types are more likely to be meaningful to their makers as markers of ethnic affiliation or group membership, and to correspond with other less easily recovered aspects of culture including language, ideology, and historical tradition, than others.

A second problem, however, is that archaeological materials do not always conform to established types. This is common, for instance, in ceramic analyses, and enters into the classificatory problem of "lumping" or "splitting" various types, series, and wares (Watkins 2009; see Chapter 7). The perpetual, hierarchical sub-categorization of material into new types and varieties, while descriptively useful, presuppose a linear, ancestral progression of parent varieties to descendant forms. Ensuing conceptual models, in which all types are distinct and classifiable (for example, see Figure 4.1), are implicitly phylogenetic and assume the principles of descent with modification and differentiation in isolation. While there are theoretically sound scenarios where such processes should historically have occurred (as, for example, with the regional differentiation of fluted projectile points among the earliest North American societies, in which geographically

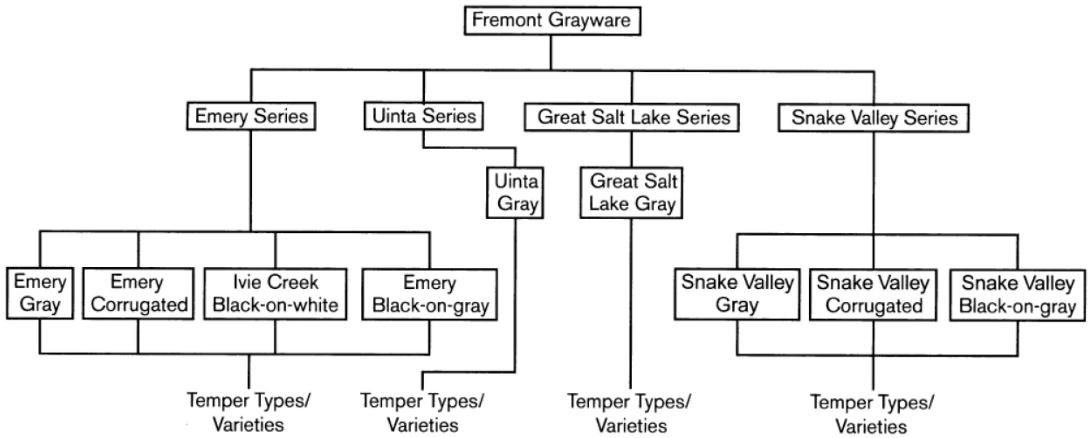

Figure 4.1. Ceramic classification scheme for Fremont ceramics (from Watkins 2009:fig. 3). A potentially infinite number of types or varieties are classifiable, with the separation of types, series, and wares resulting in a phylogenetic, treelike structure, implying strictly horizontal processes of transmission and differentiation. Note that Promontory ceramics, viewed as a separate tradition from Fremont (Watkins 2009:147–148), are entirely absent in this schema.

isolated individuals were not in communication with one another; Sholts et al. 2017), neither the problem of ambiguous specimens possessing attributes belonging to two or more types, nor the processes by which such variants may emerge (i.e., lateral transmission between individuals and groups in contact scenarios), is addressed.

Highly mixed assemblages can be confounding, especially when individual specimens possess attributes belonging to more than one category. As a matter of expedience (doubtless very common in many analyses), and out of reluctance to complicate classifications by splitting categories into excessively detailed units, small deviations from the usual type definitions are likely overlooked and the specimens attributed to any type designation are probably more variable than their labels would imply. Alternately, some analysts are loath to lump specimens in categories to which they do not fit. For instance, at the Salt Lake Airport site (42SL230), typological analysis was stymied by an inability to assign the majority of ceramic specimens to either Promontory or various

Fremont ceramic types (Allison 2002:10.5–10.8). The solution employed in this case, rather than defining new ceramic types to describe the ambiguous specimens, was to deem over 60% of the assemblage "unclassified plain ware."[19] Included in this category were examples of ceramic vessels with attributes belonging to both Promontory and Fremont ceramic types.

Ambiguity is the Achilles' heel of many classificatory schemes, and is at the heart of the distinctiveness of Promontory from Fremont, especially as assessed on the basis of ceramics (Forsyth 1986; G. Smith 2004). While monotypic ceramic assemblages, such as at Promontory Phase sites in the Utah Valley, present little conceptual challenge,

> [a]s one goes further north into the Great Salt Lake wetlands the distinction between Fremont and Late Prehistoric [ceramics] appears to crumble… some sites clearly contain Promontory materials and others contain, more or less, classic Fremont materials. It is the sites in the wetlands that grade into one another that are problematical. [G. Smith 2004:39]

Such mixing could inform us about what type of social interactions were taking place between contemporary groups.

The conceptual challenges of lumping, splitting, and unclassifiability exemplify how typological schemes are effectively blind to the gradational processes through which artifact types change when information is exchanged between groups, or when individuals move between them. They are founded in the assumption that categories are homogenous and static. While "unclassifiable" specimens are suggestive of blending processes having taken place, simply assigning them to new categories would be an unsatisfactory resolution. As noted by Di Hu (2013), emphasis on "new" forms of material culture alone can in fact obscure the persistence of existing identities. The very nature of terms like "Fremont" and "Promontory" obscures the variability between the many groups presumed to have made up those identities, the differences among the individuals who made up those groups, and the continuity between them. When such changes in material culture are accompanied by substantive demographic shifts including aggregation, displacement, and migration, as in the Late Prehistoric transition, they can be deemed representative of ethnogenetic change and the emergence of new ethnic identities (Voss 2015:656).

Population thinking: Social networks and intragroup variability

In the study of cross-cultural contact, the fundamental challenge of identifying cultural units has long been addressed by examining the differences between communities rather than "cultures," where the formation of common characteristics between them over time can be interpreted as the result of regular interaction between individuals (Murdock and White 1969; Naroll 1961, 1970). After all, "cultures" do not produce the archaeological record; people do, and the homogeneity or heterogeneity of the ethnic identities of the many individuals within any given social group has a direct bearing on the material traces those groups left behind. Even as typological analysis serves as a useful shorthand for assessing intergroup variability, intragroup variability (and in material terms, the variability within archaeological types that is, out of necessity, glossed over in many typological analyses) can be a vital resource for understanding the constituent identities of social groups and how a sense of group identity may have changed over time.

Reflecting the principles of the contact hypothesis expressed by Allport (1954), it is the interactions between people and groups themselves—and especially the positive, affinity-inducing interactions—that create "culture-constituting networks," which arise from historical connections (de Munck and Korotayev 2000:339). This is a messy proposition, as groups originating in different cultural networks can, through the process of interacting with each other, extend the reach of their respective networks, or serve as nodes that effectively link them: it should swiftly become apparent that such processes, over time, serve to obscure where one culture ends and another begins. While perhaps frustrating from a classificatory perspective, such integration is both a highly common occurrence and a desirable outcome for the analysis of the historical development of social networks through ethnogenesis. Thus to examine the possibility of cross-cultural contact taking place on Promontory Point in the mid-13th century, we may best be served by placing emphasis not on the typological characteristics of a "Promontory Culture" or "Fremont Complex" in general, but of the variability inherent to individual sites, the most reasonable representative sample for prehistoric hunter-gatherer communities, with their respective social networks being understood as emergent properties arising from contact between them and other communities over time.

Whether a matter of vertical or horizontal information flow, typologies falter when presented with variability that is, quite literally, atypical. Though they are necessary and useful for descriptive purposes, typologies can have an unintended consequence of leading to the conceptualization of cultures and cultural materials as essentialized, fully formed, and static units, a situation in archaeology that Riede, Apel, and Darmark (2012) have likened to Linnaean taxonomy prior to the advent of Darwinian evolution. Instead of dwelling on typological classification, Darwin emphasized the continuous nature of biological development, with the variation of individuals within a species being the prerequisite for the development of new ones. This shift from typologies to consideration of the full range of phenotypic variability inherent to a species, termed *population thinking* by biologist

Ernst Mayr (1959), greatly enhanced understanding of change over time in the fields of systematics and evolutionary biology (Hull 1965; O'Hara 1997; Riede et al. 2012:101). If for a moment we were to think of cultures as taxonomic equivalents to species, a shift to population thinking compels us to consider each individual, and the variability present within social groups, rather than the essentialism of a "normal" member of that society. Extending this analogy to the study of material culture, we should consider how the differences between individuals are reflected in their production, best effected not simply through the identification of culturally diagnostic types, but through the variability within those types, in which the equivalent to phenotypes are attributes.

Archaeologists have been slow to rethink their reliance on typological frameworks for describing prehistoric cultures (Bisson 2000; Riede et al. 2012:101), despite Mayr's explicit cautioning to archaeologists that typologies can in fact *obscure* both inherent variability and processes of gradual cultural change:

> "[T]he assumptions of population thinking are diametrically opposed to those of the typologist. The population thinker and the typologist are precisely the opposite. For the typologist, the type… is real and the variation an illusion, while for the populationist the type (average) is an abstraction and only the variation is real. No two ways of looking at nature could be more different" [Mayr 1959:28–29].

When attributes themselves don't appear as expected, bleeding across type boundaries in unexpected combinations, what typologists may view as a failure of the classificatory model to accurately bound variability within a preconceived scheme is in fact an indication of important population-level dynamics.

It could be countered that typologies are not meant to be real and are instead merely a provisional expedient for the categorization of assemblages. All too often, however, the atheoretical discussion of typological categories results in their being reified as real cultural units (Spangler 2002:3). Shoehorning variable forms into established types and dismissing outliers is a near inevitability, with a confirmation bias towards established concepts of prehistoric cultures a foregone conclusion. Population thinking, laying out variability in full and examining the statistical distribution of characteristics within groups, focuses on the collective activities of individuals not just as a matter of categorization, but to investigate past ethnic diversity (Ariew 2009). Since human populations are composed of individuals, each with their own unique life histories, no one group should be expected to be identical to another. At the level of material culture, similarities between groups and the contact and interchanges between them can best be assessed through the co-distribution of artifact attributes that are ever-changing and never quite overlap in the same way.

In methodological terms, while typologies and the study of phylogenetic divergence lend themselves to "tree thinking" and cladistic methods (O'Hara 1997), the study of group patterning as the result of the actions of individuals—broadly, ethnogenesis—lends itself to population thinking and the statistical analysis of the variability within and between assemblages. The many connections between individuals and groups, each with their own complex histories, can be best conceptualized not as a tree with ever-splitting branches, but as a networked structure with many interconnected nodes: a web, perhaps, or, in a time-transgressive sense, a many-braided stream. As an application of population thinking, emphasis is placed in the present study not on typological definition of groups and an averaged summary of their representative material culture, but on the variability inherent in populations, in artifact assemblages, and in attributes of artifacts themselves. This variability can be regarded as phenotypic in the sense of its being outwardly observable and attributable to particular culture-historical trends (Riede et al. 2012).

Units of transmission

If attribute-level rather than type-level variability is to be a focus of study, it must be asked whether artifact attributes are capable of being transmitted across social boundaries irrespective of the rest of their cultural packaging. In matters of stylistic differentiation, several of the cases already reviewed—calabash decoration in the Lake Baringo area (Hodder 1982), shaft decoration on arrows with the same styles of projectile points (Simms 1994)—would indicate yes, although with other aspects of personal adornment, where expressions of group membership are more strictly regulated, the answer may be less clear. How much and what kinds of information get transmitted between individuals and groups, and under what conditions, can vary greatly, and through mechanisms that are far more nuanced than the rudimentary term "diffusion" can adequately explain. In terms of craft production, for example, do individuals learn how to make complete artifacts—effectively, types—from start to finish, or do individuals learn or copy only minor aspects of each other's techniques, more akin to individual attributes of any given artifact class? Are artifact types actually minor elements packaged with much larger bundles of information (for instance, the projectile point being packaged with the rest of the projectile and delivery system)? What linguistic terms, practices, and other values (age or gender restrictions on use, functional differences between certain vessel types, etc.) accompany the adoption of an aspect of material culture? The answer is likely some combination of all the above, depending on a great many contextual contingencies: the history of the peoples involved, the nature of their relationship, and the cultural element being considered.

In exploring the concept of *cultural coherence*—the idea that some cultural elements are inherently linked to, and subject to transfer with, others—Robert Boyd et al. (1997) have posited a continuum of *cultural cores*, those aspects of a group identity that range from most to least salient to their members' reckoning of in-group and out-group membership. At one end of the continuum, all cultural elements (i.e., material culture, religion, language, etc.) are transmitted as a complete package from one generation to the next, with vertical fissioning and divergence being the sole sources of differentiation over time. For some groups, this core identity may be tied to language or religion, for others, an economy tied to a specific resource or place, and their valued nature renders them relatively impervious to outside influence. The phylogenetic processes among more contact-averse, self-reliant, and agamy- to endogamy-leaning groups following the Local Group Growth model posited by Ives (1990; 1998) could be construed as examples of the "powerful sources of isolation" Boyd et al. (1997:362–63) envisioned to operate on such strongly coherent traditions. At the opposite end of the continuum, cultural cores are very weakly if at all associated, with each element instead being untethered from the next and subject to its own processes of development. Intermediate on this scale, "cross-cultural borrowing may be frequent for many peripheral components, [but] a conservative 'core tradition'… is rarely affected by diffusion from other groups" (Boyd et al. 1997:363). A hierarchically ordered notion of coherence, with a relatively immutable core and fluid periphery, is evocative of examples from the Dene diaspora in which a multitude of cultural forms retain a common core of a highly conservative language and some form of Dravidian kinship reckoning (Ives and Rice 2006; Ives 1990). At the very least, among some groups, some aspects of cultural identity can be posited to be more resistant to influence than others.

"The issue of branching versus blending," note Shennan and Collard (2005:135), "is closely related to the coherence of cultural packages. Strongly coherent core traditions will, by definition, be fairly immune to blending." Peripheral elements—recent innovations, for example, or in migratory contexts, adaptations acquired upon entering a new geographic region, and among Proto-Southern Dene, the acquisition of a ceramic tradition (see Chapter 7)—may be more susceptible to outside influence and transitory change. When blending of traditions *does* occur, for instance with the hypothetical example of multiple refugee populations decimated by warfare coalescing into a single group, the blended tradition will only survive through resistance to outside influences and the emergence of new coherent, core traditions over time (Shennan and Collard 2005:136). Otherwise, peripheral elements would continue to rapidly change, with little observable time-depth for any given form.

It must be cautioned that the presence of multiple traditions in an assemblage "does not in itself represent blending, although it is a prerequisite" (Shennan and Collard 2005:135). The presence of some material of exogenous origin may, for example, be the product of trade rather than any ethnogenetic process. However, trade denotes some form of intersocietal contact, from which ensuing processes of blending could eventually arise. The distinction between trade and blending would likely be invisible at the level of typological analysis, in which the significance of intratype variability is minimized, but can become evident through consideration of the attributes within those types, where transmission of information between individuals is more likely to be seen.

The nature of contact or integration can be assessed by the degree and quality of the imitation. *Faithful copying* is most expected between adults and their offspring; *mixing* of adult individuals from different backgrounds should result in covariance of cultural traits; *biased transmission*, with the potential for copying errors, is more likely when successful individuals are being imitated by other adults, with greater potential for error the more dissimilar, or socially distant, the groups are (Boyd and Richerson 2005:111).

Reflecting for a moment on one of the concerns of the archaeology of human experience (Hegmon 2016*a*; Ortman 2016), perceived differences in status between members of contemporary social groups can play a role in the coherence of transferred cultural elements, with groups who are deemed more highly successful having a disproportionate influence on those of lower status, a phenomenon known as *prestige bias* (Henrich and Gil-White 2001). While the transfer of seemingly stray decorative attributes may suggest the presence of some minority identities in a given population, and perhaps even resistance to a dominant social order (cf. Hodder 1982), prestige bias has very specific implications for material culture in scenarios such as the interaction between resource-rich communal hunters and those aspiring to the practice. Specifically, with a desire to achieve the prestige-based benefits of their peers but given uncertainty over which aspects of a tradition are most beneficial, the wholesale emulation of both functional and seemingly non-functional stylistic attributes might be expected. Cultural elements are also more likely to be transferred as coherent packages between groups in contexts that "involve marked ritual observances or ceremony" as opposed to "mundane contacts like trade, in which symbolically less marked elements may diffuse readily" (Boyd et al. 1997:365)—again of relevance in considering the uptake of communal bison hunting, a practice lent legitimacy by an elaborate ceremonial complex (Oetelaar 2014).

Synthesis: A Model for Evaluating Social Contact

The many threads that have been explored in this chapter are united by a common theme: patterns of divergence and coalescence, branching and blending, or phylogenesis and ethnogenesis in the emergence of new cultural forms. In and of themselves, these evolutionary processes describe more than they explain: they are the effect rather than the cause of social forces which *do* play deterministic roles in effectuating vertical and horizontal forms of cultural transmission, and which are predicted to leave different traces in the material record. Because the default stance of much typological classification has been to describe cladistic, tree-like processes of development, in spite of this not accurately reflecting the ways in which many human social groups are formed, the archaeological outcomes of ethnogenetic processes remain poorly recognized and understood. It is thus necessary to reframe analytical models to acknowledge the differences between these two patterns of evolutionary cultural change and the culture-historical conditions that bring them about.

The textual model presented in Figure 4.2 is a synthesis of the themes discussed here, intended not to repudiate the use of standard, phylogenetic-skewed typologies in areas such as the

Kinship pattern	← Local Group Growth	-----	Local Group Alliance →
Marriage type	Endogamy	Agamy	Exogamy
Out-group relations	Negative: avoidance, hostility	Neutral: peaceful interaction, trade	Positive: alliance-seeking, coalescence
Degree of exchange	Rare (raiding, captive-taking?)	Goods and ideas	Demographic movement (intermarriage, etc.)
Predicted assemblages	Monotypic	Multiple distinct types	Attribute-level blending, indistinct types
Type of change	Phylogenetic - new identities through splitting	Some diffusion, but identities maintained	Ethnogenetic - new identities through recruitment, dissolution

Figure 4.1. Effect of positive and negative contact on intergroup relations. Motivated by kinship systems, economic needs, security, and other factors, the outcomes of contact scenarios cumulatively steer out-group relations and result in movement of goods, ideas, and people in patterns that are ultimately phylogenetic or ethnogenetic in character. Adapted in part from model proposed by Ives (2007).

Great Basin, but to highlight that they are not well suited to describing all types of behaviour, and especially falter in describing the outcomes of interaction between unrelated groups. It is widely recognized that the prevalence of cultural differentiation as a result of information transfer between related, descendant groups (i.e., vertical transmission) or between unrelated, contemporary groups (i.e., horizontal transmission) is associated with a continuum of possible out-group relations that extends from social isolation to integration. Of interest, then, are many ideological, economic, and social factors that can motivate individuals and groups to pursue either extreme of intersocietal contact, or to find some solution in between.

Gordon Allport's (1954) contact hypothesis provides a useful departure point for this discussion: contact between groups can take many forms, and not all types of contact are conducive either to the exchange of information or the same degree of exchange. What an earlier generation of archaeologists referred to under the simple rubric of diffusion is not guaranteed to occur between neighbouring groups, nor do all instances of diffusion possess a universal character. Instead, it is instances of positive social contact that play a role in fostering recursive social interactions, while instances of negative contact can stoke intergroup prejudices and lead to future avoidance.

From this lowest common denominator, of sorts, in the characterization of behaviours promoting either phylogenetic or ethnogenetic change, the challenge remains to understand why some groups actively seek out positive interactions with other groups, while some engage in negative forms of intergroup contact. Many reasons are possible; in this chapter, I have focused on two aspects of culture-historical development in the context of the Great Basin Late Prehistoric period—exogamy among migratory Proto-Southern Dene and the adoption of large-scale communal bison hunting—that would greatly promote positive intergroup interactions for the purposes of alliance-seeking and social recruitment. However, this list is far from exclusive, and I wish to assert neither that these factors were solely deterministic in cultural dynamics of this era, nor that they operated independently of one another. Rather, as drivers of positive intergroup contact, these are two of the most conspicuous factors for their novelty, timing, and repercussions, exemplifying the importance of understanding culture-historical contexts in systematic processes of culture change.

The testable and predictive attributes of this model are derived from the assertion that quality of intergroup contact determines the degree of intergroup exchange, and that these different forms of contact have different correlates. From moderate levels of contact ("neutral" here might be a less accurate description than ambivalent, a blend of sometimes-positive and sometimes-negative interactions occurring with only limited frequency) should be expected some limited interaction, for instance in the form of trade, and opportunities for the exchange of both goods and ideas to take place. The predicted assemblage in this case would be one that is familiar across much of the Greater Southwest, where some artifact types represent participation in a widely shared ideological tradition (for instance, projectile points or rock art), while others show strong local differentiation, mixed with distinct non-local goods in the form of tradewares (as with ceramics). Phylogenetic models of culture change may adequately, if not concisely, describe such social relations: in-group distinction should still be common, although some opportunities for exogenous influence may arise, with imperfect transmission likely owing to the limited opportunities for social learning and the likelihood of poor intelligibility between speakers of different languages in such settings.

The difference between an intermediate scenario and more negative contact is a matter of degree, with rarer occurrences of trade (excepting hostile acts such as raiding that would result in the sporadic movement of goods) and little or no evidence of information transmission through blending being expected as opportunities for contact become increasingly scarce. Even with new groups emerging through fissioning from parent identities, the distinctiveness of local traditions should be strongest in negative contact scenarios as out-group influences are actively prohibited and the qualities of the in-group are valorized.

Conversely, in scenarios where positive contact is actively sought, in-group distinctions should fade as events such as intermarriage and alliance erode the meaning and value of ethnic differences and as new, shared identities emerge. Some of these changes could occur swiftly: the contact hypothesis predicts positive interactions will beget an increased propensity to seek out more interactions, increasing both the frequency and quality of contact. In addition to opportunities for information exchange being highest in positive contact scenarios, the movement of people themselves can result in the local production of multiple styles, although differences between them may be indistinct. Ethnogenetic changes may be most pronounced on an intergenerational scale as children have opportunities to perfectly imitate teachers of multiple traditions. A sort of punctuated equilibrium may characterize such episodes of ethnogenesis as community members come to define the markers of their new, shared identity to distinguish the emergent in-group from yet other outsiders.

Using the model that has been presented here, it may be possible to test the hypothesis that the Promontory phenomonon was the product of ethnogenetic processes of blending and coalescence. A necessary condition for the hypothesis to be valid is that contemporary, culturally distinct populations resided in close enough proximity for contact to occur. The likelihood of ethnic and linguistic diversity within the Fremont Complex has long been acknowledged (i.e., Madsen and Simms 1998), though this has not always translated to interest in identifying meaningful culture-historical distinctions between contemporary groups, including those originating from outside the Fremont interaction sphere. There are several sites in the Bear River wetlands and elsewhere around the Great Salt Lake with typologically problematic, mixed assemblages that merit reconsideration in this regard. It was the identification of Chournos Springs, though—the previously unreported site on the west side of Promontory Point discussed in the following chapter—that presented an unparalleled opportunity to sample a geographically proximate assemblage with an eye to addressing outstanding questions of stratigraphy and chronology that have emerged in a review of other Late Prehistoric sites from the region.

If the conditions of contemporaneity and proximity are met, two principal lines of evidence for Promontory–Fremont contact can be explored. The first is direct evidence that activities representing positive social contact were actively sought. Such contact is much more difficult to identify in the archaeological record than contemporaneity alone, though the quality of preservation at the Promontory Caves allows this question to be explored at a resolution not possible in other contexts. The unprecedented frequency of gaming and gambling materials in Promontory Cave 1 offers one such line of evidence for direct intergroup contact. In his model for long-distance trade in Fremont societies, Janetski (2002:348) noted that extensive ethnographic evidence exists for gambling being a marked aspect of large intergroup gatherings such as trade fairs; in fact, out-group partners were widely preferred for high-stakes gambling activity (DeBoer 2001:233; Yanicki 2017). Coupled with a developing awareness of feasting and ceremonial activities at Cave 1, Chapter 6 examines whether the gaming evidence from the caves can serve as a proxy for intergroup contact.

The second, and likely more accessible line of evidence for intergroup contact in most archaeological settings, is indirect evidence in the form of blending of artifact styles. In this study, women's craft production is of particular interest. An unexpected aspect of the gaming assemblage is that it is dominated by different styles of dice used in primarily women's gambling games (cf. DeBoer 2001), suggesting that women from different backgrounds were present in the Promontory population—a finding that corresponds with genetic evidence for the social recruitment of women into Proto-Southern Dene societies (Malhi et al. 2003). In Chapter 7, the ceramic assemblages of Promontory Cave 1 and Chournos Springs are compared to each other to assess whether information flow, or the movement of individuals, can be detected between the two populations. The assemblages are also compared to other sites where Promontory-type pottery has been identified with an eye towards answering the question of whether typological difficulties labeled as the "Promontory Problem" in fact represent the blending of attributes through ethnogenetic processes.

Chapter 5: Excavations at Chournos Springs

A peak in occupation at the Promontory Caves, and especially Cave 1 in the latter half of the 12th century, shows the caves' occupants to have been Fremont contemporaries (Ives et al. 2014). Some interaction between the people who resided at the Promontory Caves and terminal Great Salt Lake Fremont was always suspected by Julian Steward (1937*a*), who felt that the perishable items, especially basketry, at Promontory Cave 1 indicated contact between them took place. For decades, though, lingering uncertainty over chronology, coupled with the identification of numerous sites in the Bear River wetlands and adjacent areas where Promontory-like materials (especially ceramics) were found in greater association with typically Fremont materials than at the caves (Aikens 1966, 1967*b*, 1970; Fry and Dalley 1979; Simms and Heath 1990), served to obscure any distinction between them. With time, themes of continuity and adaptation from the Formative to the Late Prehistoric period came to the fore, while Steward's claims of a unique cultural phenomenon at the caves and a smattering of other sites held diminished significance or were dismissed outright (Dean 1992; Madsen and Simms 1998).

An exception has long been noted in the Utah Valley, where evidence for a more abrupt transition at the end of the Formative period has led to more careful consideration of the impact of a separate Promontory tradition and the onset of a period where Promontory cultural influence was dominant (Janetski 1994; Janetski and Smith 2007; G. Smith 2004). Stratigraphic associations between this Promontory Phase and earlier Fremont occupations have been devilishly difficult to ascertain, however. Promontory Phase sites around Utah Lake are usually located at lower elevations than Fremont sites, and in the few instances where Promontory and Fremont-type ceramics have been found together, there has often been a lack of strong stratigraphic and chronological control. A number of essential culture-historical questions have thus proven difficult to resolve, among them the nature of the relationship between Promontory and Fremont peoples, if any, or whether a break in occupations followed by a replacement and resettlement at new locations occurred.

During the course of the Promontory research team's initial survey of the caves in April 2011, ceramics typical of both the Great Salt Lake Fremont and of Promontory occupations both at the caves and in Utah Valley were observed on the surface of a previously unreported site at some freshwater springs on the Great Salt Lake shore just 4 km from the caves (Figure 5.1). This finding provided a warrant for additional investigation of the lakeside locale. A first supposition that could be tested was whether the two communities—Chournos Springs, as the lakeshore site

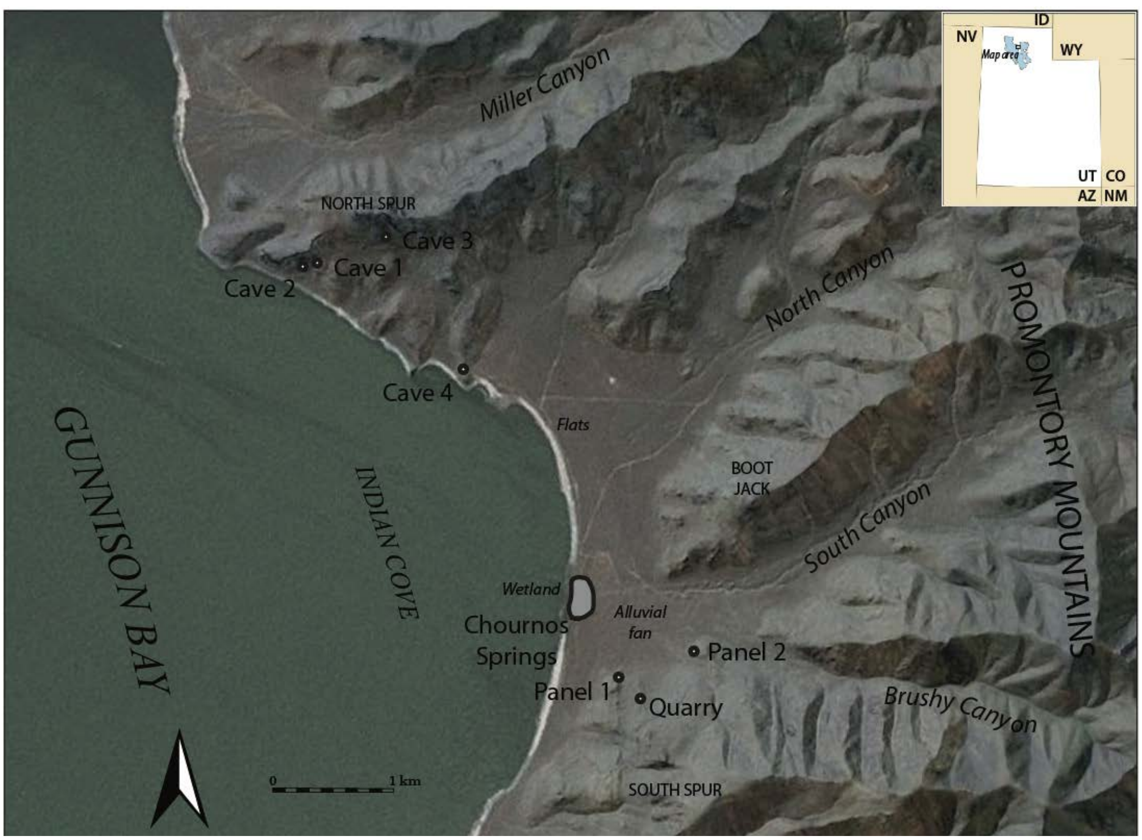

Figure 5.1. Study area on west side of Promontory Point. Archaeological sites and topographic features discussed in text are shown.

has come to be known, and Promontory Caves 1 and 2—were indeed contemporary. If so, then questions of how contact and interaction might manifest in their material record could be examined in greater detail, especially in the production of ceramics so vital to the conversation about Promontory and Fremont distinction. The opportunity also existed here to investigate a site under more rigorous stratigraphic and chronological controls than could be had from a review of collections from previously excavated sites, allowing the definition of a highly localized baseline for Fremont occupation on Promontory Point, and in an area where no Great Salt Lake Fremont occupation had previously been known.

Site Setting and Description

Chournos Springs (42BO1915) is located near the south end of the broad flats flanking Indian Cove, the smaller of the two bays on the west side of Promontory Point (the larger Rozel Bay, the setting of Robert Smithson's earthwork sculpture *Spiral Jetty*, is to the north). The bay is enclosed by two westward-reaching spurs of the Promontory Range that extend to the lakeshore. The flats are accessible by shore around the foot of the southern spur, but the steep flanks of the northern spur, from which Promontory Caves 1–4 overlook the same cove, are much less easily traversed (Figure 1.2).

A third spur, unnamed on any topographic map but called Boot Jack by the site landowners (George Chournos, personal communication, 2011), terminates well short of the shoreline, forming the eastern margin of the flats. To the north and south of Boot Jack are North Canyon and South Canyon, respectively, which extend to near the summit of the main Promontory Range. From South Canyon and a third, smaller Brushy Canyon, extends the

Figure 5.2. View east from Chournos Springs of South Canyon, Boot Jack on left, and main range of Promontory Mountains in distance, May 2014. Note sloped, rocky outwash of alluvial fan extending from foreground to the mouth of South Canyon. Photo courtesy Courtney Lakevold.

accumulated sediment of a boulder-strewn alluvial fan crisscrossed by a network of gullies and more deeply cut arroyos (Figure 5.2).

North of the alluvial fan, greasewood-strewn flats extend from the mouth of North Canyon to the lakeshore, at a slightly lower elevation and flanked to the north by the spur bearing Promontory Caves 1–4 (Figure 5.3).

Just below the alkali-encrusted high-water mark of the Great Salt Lake (1,284 m a.s.l.) at the scarp-like toe of the alluvial fan is a series of seven freshwater springs. These are the outlet of year-round subsurface flow, probably from the same high-elevation sources responsible for the alluvial fan itself. In a landscape otherwise dotted with greasewood and other aridity-tolerant brush, the springwater drainage channels weaving through the exposed lakebed to the current waterline form a thriving, highly localized wetland (Figures 1.3, 5.4).

Figure 5.3. View west-northwest of Indian Cove from upper part of alluvial fan at mouth of Brushy Canyon, May 2014. Low greasewood-dotted flats are in upper right; Chournos Springs site, wetlands, and old Sheehan Ranch are marked by large cottonwood tree in upper left. Photo courtesy Courtney Lakevold.

This part of Promontory Point has been owned for three generations by the Chournoses—George and the family of late brother Sam—who raise cattle and, seasonally, sheep on the land. Prior to that, the flats adjacent to the springs were owned by a rancher named Sheehan, while the mountain spur bearing the caves was acquired after Steward's time in a land-swap with the Bureau of Land Management (George Chournos, personal communication, 2011). An old barn on the alluvial fan above the springs and a pit filled with rusted metal debris a short way up the trail to South Canyon probably date to Sheehan's time, while additional structures are more recent. The Chournos family currently uses the location of the ranch as a seasonal camp.

The springs were noted by Julian Steward in his discussion of Promontory Cave 1: "The nearest water is seep springs at Sheehan's ranch, more than 2 miles away, and there is not the slightest reason to believe that closer water was available when the cave was inhabited" (Steward

Figure 5.4. One of several freshwater springs in the wetlands below 42BO1915, April 2011. Promontory Caves in distance.

1937*a*:10). Saltwater springs are nearer the caves, and more distant freshwater springs are noted on U.S. Geological Survey maps to the north and northeast of Promontory Caves 1–4. These include Miller Springs at the head of Miller Canyon, the next valley north, about 6.4 km (4 miles) from Cave 1 and 5.6 km (3.5 miles) from Cave 3. Indian Springs and Rose Spring on the lakeshore near Rozel Flat, where the west side of Promontory Point meets the mainland, are more distant (USGS 1991*c*, 1991*d*). The ready supply of fresh water at the lakeside springs on the Chournos family's property, otherwise quite scarce along the Promontory Range, would historically have been a draw for big game, while the surrounding wetlands offer abundant plant and avian resources. They would thus have been an obvious focal point for prehistoric human occupation.

The presence of a substantial prehistoric site here was brought to the attention of the Promontory research team at the onset of the project in April 2011 by Kumeroa Chournos. Following an initial surface survey and collection that year, the site became the focus of additional survey and excavation in 2013 and 2014. In choosing a name for the site, it is noted that both the springs and the flats are featured on the USGS 7.5' topographic map for the area (USGS 1991*b*), but their names consist of a term frequently considered to be an offensive epithet for Indigenous women, and which is derived from non-local Algonquian languages (R. Green 1975; cf. Bruchac 1999; Goddard 1997). The project team therefore chose Chournos Springs, which recognizes the many contributions of the Chournos family to the Promontory archaeological research project and their sincere desire to see the story of both this site and the Promontory Caves told.

Site area

The Chournos Springs site is situated entirely on a bench at the toe of the alluvial fan, framed to north and south by arroyos which channel seasonal surface water drainage from South Canyon and Brushy Canyon, respectively. Artifacts including chipped stone flakes and tools, ceramic fragments, faunal bone fragments, fire-cracked rock, and broken groundstone tools are scattered on a gently sloping bench just above the highwater mark from about 1,286–1,289 m a.s.l.

The entire site area was walked in linear transects in May 2013, and surface finds were flagged for subsequent mapping (Figure 5.5). The surface artifact scatter extends over a 300 m stretch of shoreline corresponding with the extent of the wetland surrounding the springs. The locations of the depressions, surface finds, and the general site area were mapped in May 2013 by Dr. Kisha Supernant using a high-precision Global Navigation Satellite Receiver. Artifact exposures are concentrated in areas of surface disturbance including vehicle and cattle trails and

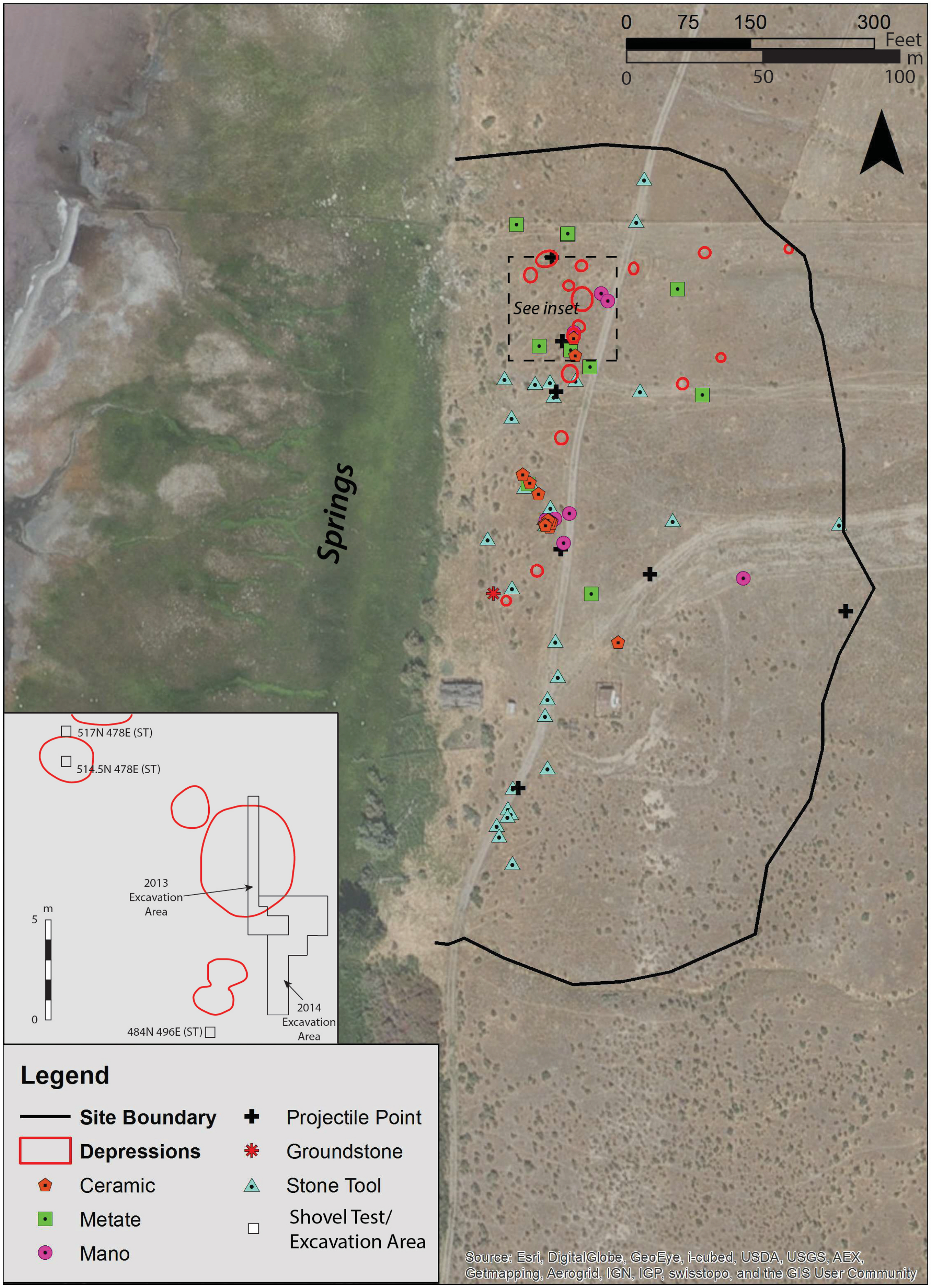

Figure 5.5. Chournos Springs site area including GPS-plotted depressions and surface finds (courtesy Kisha Supernant), with detail of excavation areas and shovel tests (STs).

a bulldozed fireguard built after a lightning-sparked grassfire up South Canyon in 2012 (George Chournos, personal communication, 2013), as well as in 16 saucer-shaped depressions, 2–5 m in diameter and 10–25 cm deep, that are distributed in an arc up to about 100 m from the highwater mark. Walked transects extended at least 50 m beyond the last observed surface find in each direction on the alluvial fan. The wetlands surrounding the springs themselves, where dense surface vegetation generally obscures the muddy, boulder-strewn, often impassable surface, were not surveyed in this fashion.

Site summary

Excavation in 2013 initially focused on trial testing of the largest depression for possible cultural associations via a trench transect. Though sediments within this feature were eroded and faunalturbated, an intact prehistoric occupation surface and associated structural debris were exposed within well horizonated soil in the area immediately adjacent to the depression. Controlled stratigraphic excavation of this adjacent area was conducted both in 2013 and in 2014. One major occupation surface was found and partially excavated, featuring piles of beam-impressed, fire-hardened adobe, postholes, charred beams, adobe melt, and numerous sherds of a distinctive, highly decorated, sand-tempered ware in direct contact with a well-defined, hard-packed floor—attributes which allow this to be identified as a probable Fremont dwelling, comparable to semi-subterranean pit house structures excavated in the Bear River wetlands (cf. Aikens 1966, 1967*b*; Fry and Dalley 1979). Draped over the buried structural debris is a 20-cm veneer of midden-like materials including mixed ceramics and other material suggestive of post-Fremont, Late Prehistoric occupation (cf. Simms and Heath 1990), while beneath the floor are aceramic, possibly Archaic deposits. The areal extent of surface deposits would suggest additional buried occupation surfaces and structures are present. Three 1-m-x-1-m test units were opened near the main excavation area and confirmed the presence of stratified cultural deposits, but no additional structures were identified.

Other sites

Chournos Springs is not the only previously unreported archaeological site near the caves. A full accounting of these sites is not presented here, and no thorough survey of the area has yet been conducted. These other sites do bear mentioning as indications of a more intensive prehistoric occupation in the vicinity beyond what the limited excavations at Chournos Springs might suggest.

At two locations, previously unreported rock art panels are present on the mountain spur that forms the south boundary of Indian Cove and the alluvial fan. Both were shown to the Promontory research team by Kumeroa Chournos. Panel 1, facing north, is at the south spur's foot (about 1,340 m a.s.l.), and the westward-facing Panel 2 is nearer the head of the alluvial fan at the mouth of Brushy Canyon (about 1,390 m a.s.l.). Both consist of petroglyphs pecked in desert varnish, a purplish oxidized rock coating, to expose lighter-coloured material underneath. Panel 1 features indistinct geometric motifs and possible horned zoomorphs (Figure 5.6). Among the figures at Panel 2 is what appears to be an antelope, deer, or bighorn sheep (Figure 5.7). These are different in manufacture from the pictographic panels in Cave 1, composed of painted red ochre. Steward (1937*a*:88) did note, however, that one "much-faded mountain sheep (?)" of similar style is near the painted anthropomorph at the rear left of the cave; this figure is not as legible today as Steward described. Also at Cave 1, he reported another figure "representing a mountain sheep [that] was removed a few years ago" (Steward 1937*a*:87). Aside from the "kachinas" and mountain

Figure 5.6. Petroglyph Panel 1, near Chournos Springs. Photo courtesy Jen Hallson.

Figure 5.7. Petroglyph Panel 2, near Chournos Springs. Photo courtesy Courtney Lakevold.

sheep in Cave 1, Steward was not aware of any other rock art on the west side of the point. However, a new, indistinct red ochre pictographic panel was also found under the overhang of a large boulder on the trail between Caves 1 and 3.

Near Panel 1 and a short climb up the mountainside (1,360 m a.s.l.) is an outcrop of coarse-grained quartzite that, judging from a sparse scatter of large primary flakes, was used as a quarry. Farther up (about 1,524 m a.s.l.), quartzite cobbles can be found eroding from a stratum of loosely bound conglomerate that forms the ceiling of a shallow, westward-facing rockshelter. No evidence of quarrying or other human activity was observed (the floor of the rock shelter is covered in deposits from the soft, eroding ceiling), but similar cobbles are strewn over nearby slopes and on the alluvial fan, suggesting this cobble-bearing conglomerate has additional exposures.

On the walk up the alluvial fan to inspect Panel 1, about 750 m from Chournos Springs (1,321 m a.s.l.), an isolated find was made of a single projectile point, made from a milky white chalcedony. The point is of the Desert Side-notched type with rounded side notches, a squared, expanding base, and a basal concavity with a distinctive spur on one side. The point has been included in the Chournos Springs collections (42BO1915:930.1). This and obsidian scatters on the high trail and saddle between Caves 1 and 3 likely represent Late Prehistoric hunting activity in the uplands by residents of both the springs and the caves.

Also of note are a number of other previously unreported caves in both the south-facing slopes at the north end of the valley, and in the north-facing slopes at the south end of the valley. Several, in addition to Caves 1, 2, and 3, are in view from Chournos Springs. Most of these remain uninvestigated—the exceptions are one apparently uninhabited south-facing cave above Cave 1 and a small north-facing rockshelter above the grass-covered saddle at a low point in the crest of the ridge between Cave 1 and 3, looking out on the expansive Promontory shoreline beyond. Both the rockshelter and the saddle itself bore archaeological materials and are likely associated with the hunting activities that yielded the abundant game seen in Cave 1 (Ives 2017).

Of final note are two sites reported by George and Kumeroa Chournos that have not yet been revisited or recorded by members of the Promontory team. One is a possible rock alignment on the alluvial fan, described by George Chournos (personal communication, 2014) as possibly being a tipi ring, uphill from Chournos Springs and somewhere near the foot of Boot Jack and the mouth of South Canyon. While several attempts were made to locate this site, its presence and function have not yet been verified. The other is a buried site at some high-elevation springs—probably Miller Springs (USGS 1991*d*), at the head of the eponymous canyon north of the caves–exposed while excavating a dugout. Several groundstone artifacts were found, including a pair of well-executed, two-handed manos (George and Kumeroa Chournos, pers. comm., April 2011 and May 2013; Figure 5.8). While these springs are about 2 km farther away from the caves than

Figure 5.8. Manos from undocumented high-elevation site near Miller Springs, photographed courtesy George and Kumeroa Chournos.

Chournos Springs, their elevation (~1706.9 m a.s.l.) is nearer that of Cave 3 (1637.4 m a.s.l.) than the lakeside springs (1228.1 m a.s.l.). It is possible that, travelling via the saddle and paths up Miller Canyon, this distance may have been more easily traversed than the steeper slopes to the lakeside wetlands at Chournos Springs.

Excavations and Stratigraphy

Excavation areas and methods

The areas excavated at Chournos Springs are shown in Figure 5.5. Excavation initially targeted the largest of 16 shallow depressions to determine whether it was a natural or cultural feature. A 50-cm-wide trench was excavated from slightly beyond one rim to slightly beyond the other (6.5 m length, 3.25 m2 total), the objective being to recover buried cultural materials in association with natural or cultural strata.

At the south margin of the depression, a pile of shallowly buried, beam-impressed adobe was exposed. Immediately beneath this and extending away from the depression was a clearly defined prehistoric living floor consisting of relatively hard-packed, darkened silt. Following the extent of this floor away from the depression area, which intersects and obliterates it, a 13 m^2 main excavation area was opened in 2013 and 2014.

Three 1-m-x-1-m test units were also excavated in 2014 to assess whether the same natural and cultural stratigraphy observed in the main excavation area extended over other parts of the site. Test Unit 1, 5 m south of the main excavation area, was placed in an open area between depressions. Test Unit 2 was placed in the center of a smaller depression, and Test Unit 3 on that depression's edge.

Excavation proceeded by removal of a thin topsoil layer (usually 2-5 cm in depth) consisting of roots and vegetation, followed by arbitrary 10 cm levels (or portions thereof) until cultural features, including the buried floor, were reached. All excavated sediment was hand-screened in 6 mm (¼") mesh. The trench and test units were excavated by shovel, with an emphasis on the exposure of soil profiles and determination of the depth and integrity of cultural deposits. Units in the main excavation area were extensively excavated by trowel. Floor plans were drawn in the main excavation area, while three-point provenience of features and *in situ* artifacts was recorded with a total station. Cultural features were photographed and excavated in cross-section where appropriate. Bulk sediment samples were collected from floors, hearths, and other significant features for later soil flotation and analysis of preserved macrobotanicals.

Stratigraphy

In keeping with archaeological practice in Utah, both cultural features and significant natural features (such as the break between aeolian sediment and underlying alluvium, or the contents of a large krotovina) were assigned unique feature numbers, abbreviated as F1, F2, and so on. Whenever possible, these were excavated as discrete units (in 10 cm increments when necessary) and screened separately, although these field identifications were inherently provisional. Often, for instance, the same significant feature was detected in different areas and assigned different numbers, while most gradations in natural soil horizons could not readily be distinguished except in soil profiles, requiring subsequent reconciliation.

For ease of discussion, general references to the depth of strata and features are given here as below surface (b.s.), although absolute measurements, including surface contours (corner and center points of each excavation unit) were recorded as below datum. The surface depth of the excavation areas was highly variable, most pronouncedly within the depressions, which dipped >15 cm from the surrounding surface. Outside the depressions, the ground surface sloped downward both to the south and west, at about 2 cm/m. No corresponding slope was observed on buried, hard-packed surfaces, so in places—particularly the southernmost excavation units—the thickness of overlying fill is slightly more compressed than described here.

Depositional setting

Surface artifact distribution is used to designate the boundaries of the Chournos Springs site in Figure 5.5. This site area is roughly divided by a well-defined trail, and which marks a change in surface deposition. The area west of the trail generally defines the portion of the alluvial fan lacking large cobbles and boulders on the surface, which are increasingly abundant upslope and east of the trail. Because the site area corresponds with the location of a historic ranch, it is possible part of the surface was once intentionally picked clear, but no distinct rockpile was observed. A general absence of large, unmodified rocks was confirmed during excavation, in places down to more than 80 cm below surface (b.s.), around which depth alluvium of pebble and larger cobble size consistently appeared.

Excavated sediment consisted of very fine-grained silt, presumed to be aeolian in origin, which generally blew away during screening. It is noted that the toe of the alluvial fan is situated adjacent to the exposed, silty lakebed and faces the direction of prevailing winds. Deposition at the site therefore appears attributable to wind-transported load, with concentration on the lakeward edge of the fan being analogous to foredune development (Hesp 2002), and with the accumulation of silt-sized particles being attributable to a dust trap effect from the moist wetland immediately upwind (Tsoar and Pye 1987).

The prevalence of aeolian rather than alluvial deposition has important ramifications for the condition of buried cultural deposits here, which are likely to be slowly buried in their original provenience and little impacted by surface water flow. However, the stone-free sediment also offers little impediment to burrowing insects and rodents, with krotovinas being a significant disturbance factor at the site.

Lithostratigraphic units

Two principal lithostratigraphic units were exposed during excavation. Unit I, >20 cm thick (60–80+ cm b.s.; no maximum depth reached), consists of rocky alluvium—mostly weathered quartzite gravel and cobbles—interspersed with medium silt. Unit II (0-60 cm b.s.) consists of horizonated fine silt. Artifacts and features associated with Fremont occupation and the Late Prehistoric transition were found solely in the uppermost 30 cm of Unit II. Sparse materials of suspected Archaic origin were found at depths of 30–60 cm b.s., while the alluvial Unit I deposits were culturally sterile. It is possible that the uppermost alluvial deposits encountered during excavation are superimposed over older aeolian or even wetland and lacustrine deposits at greater depth and could bear evidence of even earlier human occupation. However, the research focus on cultural deposits from the Formative and Late Prehistoric periods precluded any investigation of this possibility during the present study.

The cobbles and gravels exposed on the surface of the alluvial fan upslope and with increasing distance from the lakeshore appear to correspond with Unit I, and Unit II, where present, is presumed to be quite shallow. Alluvium is conspicuously absent over the site area and within Unit II. Rather than being an aggradational surface built through the downslope transport of alluvium, the fine silt deposits of Unit II appear to be developmentally upbuilt through the aeolian transport of loess from the adjacent, periodically exposed lakebed when water levels are low. A counterpoint to this accumulative process is that during lake maxima when source load is unavailable, periodic deflation may occur, resulting in the formation of palimpsests of cultural material. Brushfires, grazing, and other disturbance may further destabilize this surface and exacerbate soil erosion.

Within the upper Unit II loess deposits, the sparse vegetation cover on the modern surface yields no distinguishable humic-rich O horizon, highlighting its erosional susceptibility. A thin, loosely compacted dark gray A1 horizon, possibly darkened by charcoal particles and bearing extensive plant rootlets (Munsell 10 YR 4/1; 0–3 cm BS) transitions into a thick B1 horizon of grayish brown silt (Munsell 10 YR 5/2; ~3–30 cm BS). This in turn gradually blends into an illuviated brown B2 subsoil (Munsell 10 YR 4/3) where calcium carbonate-encrusted alluvial gravels and cobbles become increasingly common with depth (~30–60 cm b.s.). The underlying rocky alluvium of Unit I comprises the C horizon. No laminae or paleosols are visible in wall profiles, although individual cultural features were identified at varying depths based on soil compaction, coloration, and artifact concentrations. These features appear to be deposited in slowly accumulated sediment, increasing depth generally corresponding with increasingly old, but poorly defined palaeosurfaces (cf. Cremeens and Hart 1995; Holliday 2004).

Bioturbation

Bioturbation has been a significant factor in soil development at Chournos Springs, with the gradient A–B horizon transition indicating ongoing soil churning by burrowing animals near the surface. Buried, compacted surfaces—particularly prehistoric occupation floors—formed a barrier to burrowing rodents, and krotovinas were especially noted running horizontally along them. While caution was taken during excavation and analysis to separate artifacts resting on intact occupation surfaces from those found in krotovinas, it is reasonable to suspect some vertical displacement of materials in the overlying and underlying sediments where no intact palaeosurfaces were detected, and where relative depth was the only excavation control.

Evidence of bioturbation may also be present in the yields from flotation of bulk sediment samples, in which both charred and uncharred macrobotanical elements were found. While there are reasonable grounds for identifying charred seeds, endocarps, and even stems of edible plants as the product of human processing and consumption, considerably less certainty exists over elements that are unburned and are in fact unlikely to be preserved for any length of time (Puseman 2015).

Cultural Occupations and Chronology

Determination of the cultural sequence at Chournos Springs requires consideration not just of the natural stratigraphy at the site, but the association of cultural features, radiocarbon dates, and artifact types. Artifact concentrations, including lithics, pottery, faunal remains, and fire cracked rock, were abundant at varying depths, particularly in the uppermost 20 cm of fill. The deposits are interpreted as representing occupations of varying duration and intensity from four broad periods: Archaic (Component A), Formative (Components B1 and B2), Late Prehistoric (Components C1 and C2), and Historic (Component D).

Features

Both natural and cultural features were observed and excavated at Chournos Springs (Figures 5.9 and 5.10). Cultural features include two highly compacted occupation surfaces associated with a semi-subterranean structure, as well as associated structural features including stick-impressed adobe piles, horizontally and diagonally oriented charcoal clusters, and postholes.

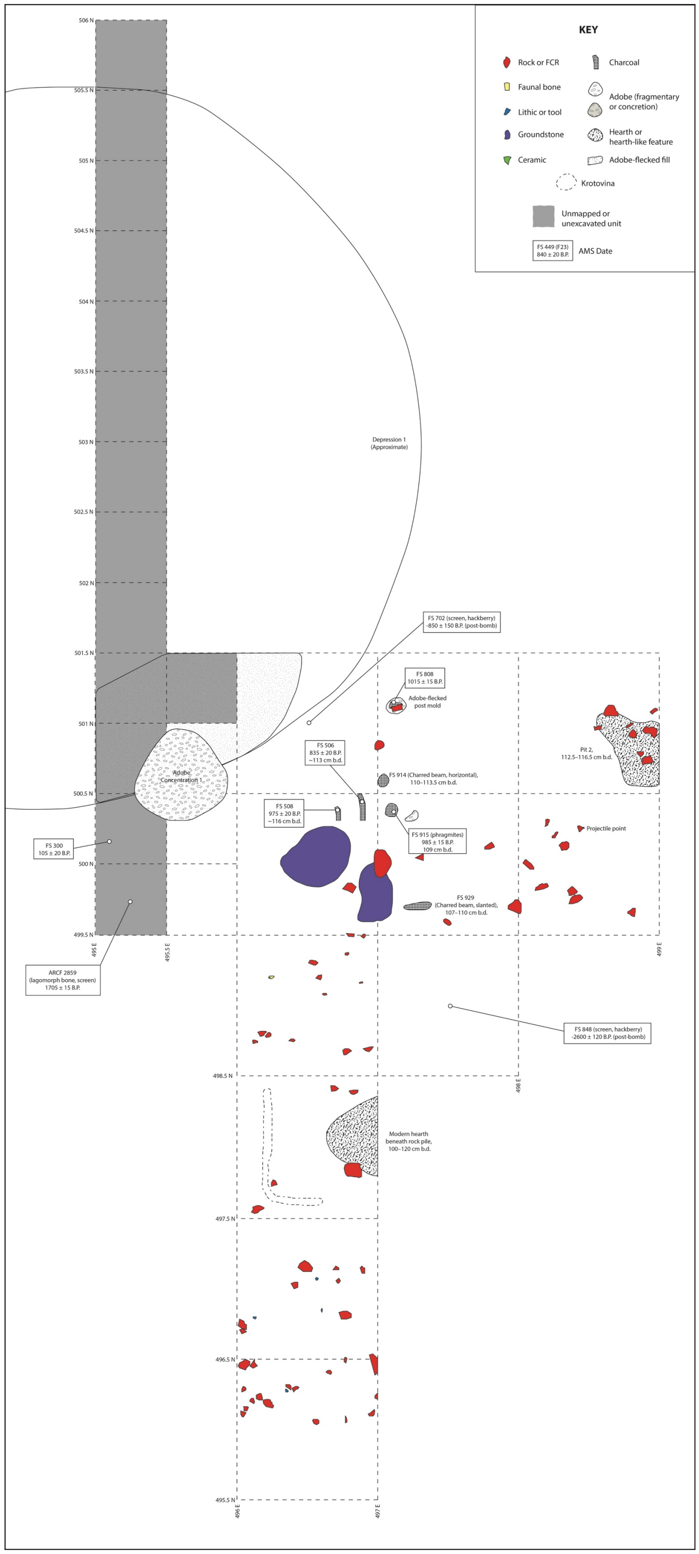

Figure 5.9. Floor plan of units in main excavation area, 98–118 cm below datum (broadly, Components C1, C2, and D). Units in preliminary test trench (dark gray) were not mapped.

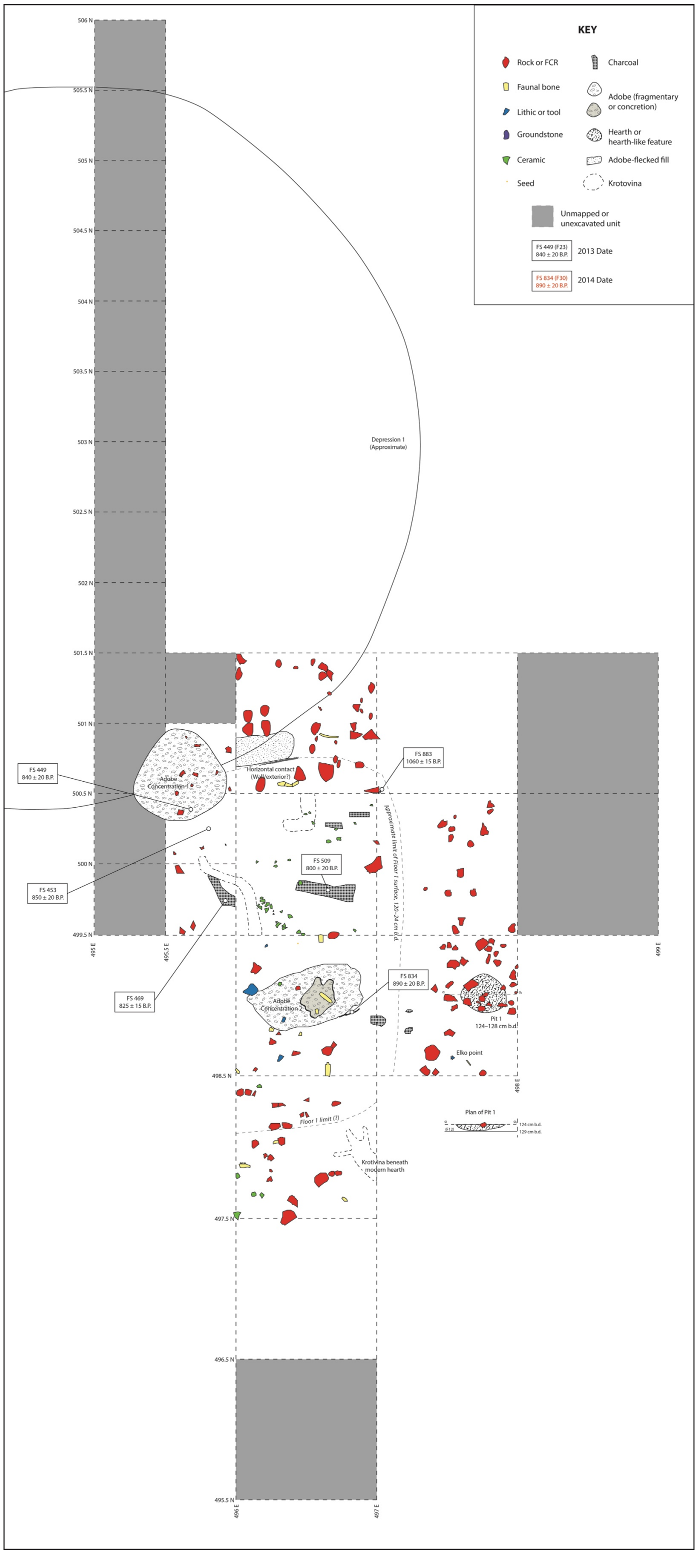

Figure 5.10. Floor plan of units in main excavation area, 118–128 cm below datum (broadly, components A, B1, and B2). Hard-packed occupation surface (F23) was most pronounced between and beneath the two adobe piles.

Non-structural cultural features include shallow pits or hearths and a modern rockpile. The large depressions scattered throughout the site area appear to be of natural origin.

Depressions

The transect of the largest saucer-shaped depression (Depression 1) showed it to be an eroded bioturbation feature. A sharply defined aeolian erosional contact was visible separating A- and B-horizon deposits at ~10 cm b.s. This contact follows the basin-shaped contour of the 25-cm-deep depression, tapering out at the edges of the depression and intersecting both Floor 1 and Adobe Pile 1, described below, at the depression's southern margin. The saucer-shaped erosion is characteristic of a blowout, a dune destabilization feature commonly initiated by animal grazing, fire, or human activity (Hesp 2002). The feature has since stabilized and partially filled in; pebble-sized adobe fragments scattered in the fill above the erosional contact, probably broken off the adjacent partially exposed adobe pile, suggest trampling to have been a significant factor in the creation or maintenance of the depression. Any trace of intact occupation surfaces within the depression area, should they have been present, has been obliterated. Cultural materials recovered from this disturbed area are presumed to have been subject to some mixing and are excluded from the stratigraphically sorted analyses presented here. A second depression (Depression 2) was tested with two test units. These units yielded abundant cultural materials and from greater depths than in the main excavation area (45–55 cm b.s. or deeper), but no discernible differences in stratigraphy were noted between them, and no cultural features were noted.

Rockpile and hearth (historic)

Found on the surface of the main excavation area about 4 m south of Depression 1, a closely piled, 40 cm-diameter concentration of rocks, none of them culturally modified, was removed while preparing units for excavation. A small mound of silty sediment incompletely filled the spaces between the rocks; beneath this was a 20-cm-deep basin-shaped hearth of recent origin containing ash, metal scraps, nails, large pieces of charcoal from a squared wooden beam (as of a railway tie or other sawed timber), and a short segment of graphite pencil lead. This feature was removed in full before excavation commenced.

Underlying this historic firepit was an expansive krotovina with adjoining burrows extending beyond the diameter of the hearth, raising the likelihood of recent charcoal and other material being dispersed into adjacent units. No historic cultural material was encountered outside this feature, but two hackberry seed pericarps yielded problematic modern dates (see below).

Floors

Immediately beyond the south margin of Depression 1, in undisturbed sediment within the B1 subsoil at ~21–24 cm b.s., a distinct occupation surface (Floor 1; Field ID: F23) was identified based on sediment compaction, a slightly darker color (10 YR 4/3), and a large number of flat-laying artifacts including ceramic fragments, lithics, and charcoal clusters rest resting directly on it. Its variable depth suggests a slightly basined shape. Two concentrations of fire-hardened, stick-impressed adobe (Adobe Concentrations 1 and 2) were also found lying directly on this surface. A large, lightly used metate was found in the approximately 10 cm-thick "floor zone" immediately overlying this surface, together with additional horizontally or diagonally oriented charcoal clusters that had the appearance of burnt structural beams.

The surface of Floor 1 was followed east and southward from the point it was initially detected, beneath Adobe Concentration 1, but was found to abruptly taper off in each direction excavated. To the north, the floor was visibly cut through by Depression 1, with adobe flecks following a buried, basin-shaped contour within the depression. Additional portions of the feature remain unexcavated west and south of its point of initial detection. Unfortunately, with the exception of the intersection with Depression 1, no precise margin to the floor was found, and rather, it was noted while excavating at a consistent depth that compacted sediment became thinner, and then was no longer present. Beyond this, B1 subsoil continued uninterrupted through the ~21–23 cm b.s. depth range.

Along the margin at which the compacted sediment of Floor 1 tapered off at its eastern periphery but at a higher level (~13 cm b.s.) was a second hard-packed surface (Floor 2; Field ID: F42). This upper compacted surface itself was noted only in a small area (~30 cm^2), and in such close lateral proximity to the lower surface as to appear nearly overlapping it. No vertical unconformity linking the two compacted surfaces was observed, as might be expected for a wall adjoining the floor of a shallowly excavated pit house to an adjacent contemporary exterior surface. However, the alignment of several corollary features nevertheless allows the presence of such a structure to be inferred. Three clusters of flat-lying charcoal fragments, additional large adobe fragments, and one posthole were found in a roughly N–S linear arrangement, resting on or at the same depth as Floor 2 and parallel to the boundary at which Floor 1 tapered off to the east. Also at the same depth as this second surface, and between the margin of where Floor 1 was observed and the linear arrangement of posthole, adobe, and charcoal clusters was observed, an additional large groundstone slab was recovered (FS 807.1, seen at lower right in Figure 5.11), suggesting the presence of an interior, ground-level ledge within the structure.

<u>Adobe concentrations</u>

Two piles of fire-hardened, stick-impressed adobe (Figures 5.12 and 5.13) were found

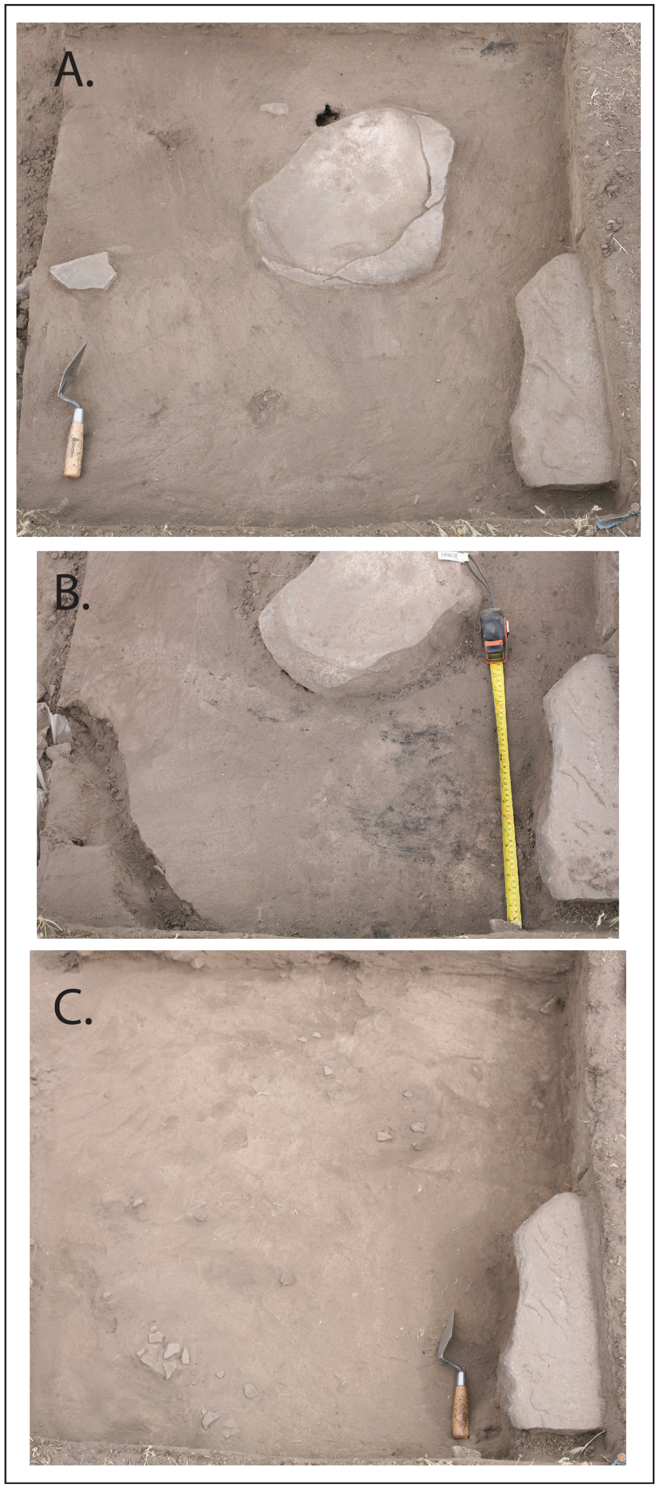

Figure 5.11. Sequence of photos showing excavation of Floor 1 in Unit 499.5 N 496 E. A) A large, lightly used, badly weathered metate (FS 505) is exposed, together with horizontally aligned charcoal clusters and krotovinas; depth approx. 18 cm b.s. B) Krotovinas are cleaned out and a large concentration of *Salicaceae* charcoal fragments (FS 509) is exposed in floor zone; depth approx. 20 cm b.s. C) Clusters of ceramic fragments are scattered on hard-packed surface of Floor 1 beneath metate and charcoal deposits, parallel with bottom of krotovinas; depth approx. 23 cm b.s.

Figure 5.12. Initial exposure of Adobe Concentration 1 at south end of test trench across Depression 1 (view south).

resting directly on Floor 1. The first (Adobe Concentration 1) was found at the edge of Depression 1, roughly circular in shape and spanning an area of roughly 60 cm x 60 cm. It was composed of crumbling adobe fragments ranging in size from pebble-sized to fist-sized and greater, and included pieces of fire cracked rock. This adobe pile was significantly undercut by large krotovinas, initially obscuring the relationship with Floor 1, but with profile cleaning and expansion of the excavation area, small portions were observed in direct contact with the hard-packed surface. As with the general area of Floor 1, no mound was visible on the surface to betray the presence of such a large concentration of structural debris.

The upper margins of the pile extended into the shallow A horizon deposits at a depth of about 3 cm b.s., for a total height to the adobe of about 20 cm, with minor concentrations of adobe flecks in adjacent A and B horizon sediment indicating melting and degradation as it was gradually buried, and possibly from the structure's exterior while it was still standing. A buried, 3–4 cm-thick layer of yellowish adobe flecks following the basined contour of the rim of Depression 1, covered by an additional 5–10 cm of more recent aeolian deposition, indicates that part of the adobe pile was exposed when the depression was made, and trampled fragments washed into the depression at or shortly after the time of its creation.

About 2 m southeast of the first adobe concentration, also resting directly on Floor 1, was a second adobe feature (Adobe Concentration 2) consisting of one 25 cm x 30 cm block and

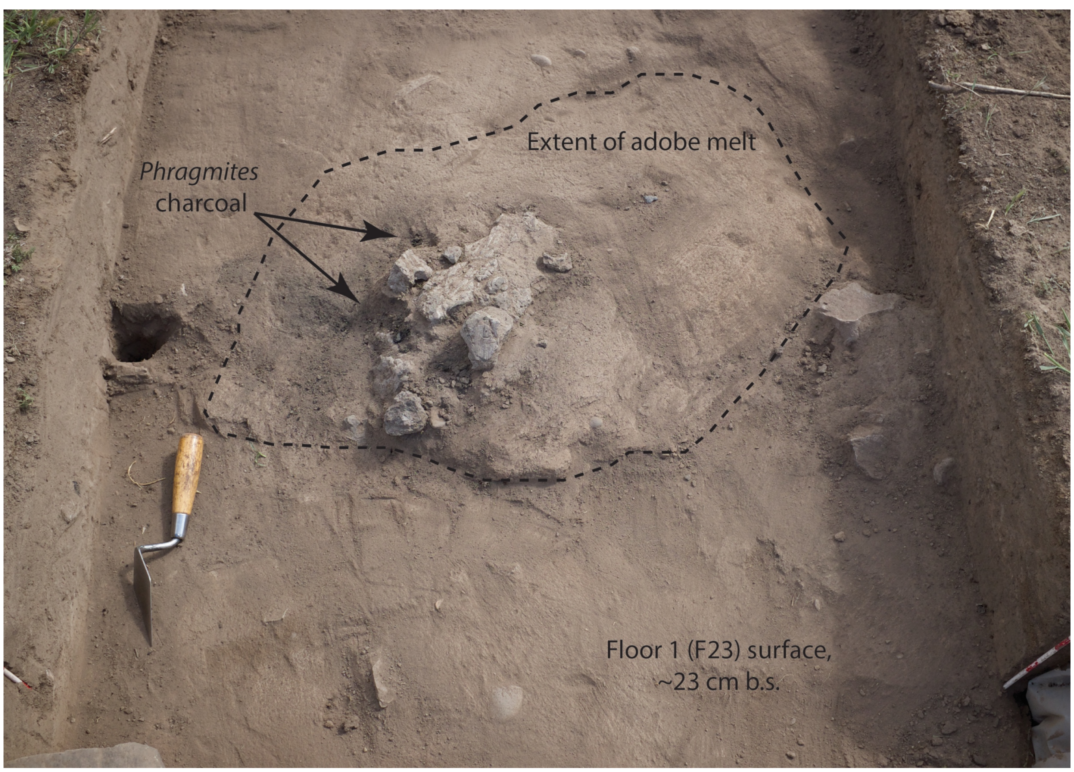

Figure 5.13. Initial exposure of Adobe Concentration 2 in Unit 498.5 N 496 E (view south). Large stick-impressed and hand-moulded, fired adobe pieces are surrounded by an amorphous concretion of adobe melt and charcoal clusters resting on Floor 1 surface, followed here from depth seen in Figure 5.11*c*.

Figure 5.14. Extensive stick impressions on underside of large fired adobe fragment recovered from Adobe Concentration 2. Scale in cm.

several smaller pieces of blackened, fire-hardened adobe set in a 50 cm x 60 cm smear of melted, dissolved adobe. Cleaning the fired adobe *in situ* revealed smoothed streaks and impressions indicative of hand-molding, as of mud that was pressed down on a thatch-lined wooden superstructure in jacal construction, and which hardened when the structure was burned. As anticipated, the underside of the largest piece was interlaced with impressions of grasses and small sticks (Figure 5.14).

Numerous charcoal fragments, including well-preserved stems of common reed (*Phragmites australis*), were set in and beneath the hardened adobe (Figure 5.15), along with a ceramic sherd (the dimpled bottom of a primarily sand-tempered vessel with trace amounts of calcite) sandwiched between the adobe melt and the surface of Floor 1.

Figure 5.15. Charred *Phragmites* reed segments (FS 834) on Floor 1 beneath cemented melt of Adobe Concentration 2, 24 cm b.s.

Charcoal concentrations

More than two dozen concentrations of charcoal were encountered in the main excavation area, several of which could not be definitively associated with postholes or hearths (Table 5.1). Many of these were collected under individual field specimen (FS) numbers, while larger concentrations (generally greater than 5 cm in diameter) were recorded as distinct features. Charcoal samples were submitted for species identification by Kathryn Puseman of Paleoscapes Archaeobotanical Services Team (PAST), LLC (Puseman 2015).

With two exceptions, the charcoal concentrations were found in one of three contexts: either 1) laying horizontally on the surface of Floor 1, 2) in the floor zone fill immediately above

Table 5.1: Charcoal specimen species identifications (from Puseman 2015).

Specimen No.	Component (Feature)	Species	Part	Ct.	Weight
FS 300	3a (Upper Fill)	*Sarcobatus vermiculatus/ Allenrolfea occidentalis*[20]	Charcoal	14	0.104 g
		Sarcobatus vermiculatus/ Allenrolfea occidentalis (vitrified)	Charcoal	6	0.012 g
FS 415	2b (Floor Zone)	*Sarcobatus vermiculatus/ Allenrolfea occidentalis*	Charcoal	2	0.007 g
FS 449	2a (Floor 1)	*Sarcobatus vermiculatus/ Allenrolfea occidentalis*	Charcoal	7	0.005 g
FS 453	2a (Floor 1)	*Acer negundo*	Charcoal	7	0.036 g
		Sarcobatus vermiculatus/ Allenrolfea occidentalis	Charcoal	5	0.006 g
FS 462	2b (Floor Zone)	Salicaceae	Charcoal	11	0.014 g
FS 469	2a (Floor 1)	Poaceae	Stem	25	0.151 g
		Sarcobatus vermiculatus/ Allenrolfea occidentalis	Charcoal	2	0.013 g
		Juniperus spp.	Charcoal	1	0.004 g
		Salicaceae	Charcoal	2	0.012 g
FS 506	2b (Floor Zone)	Poaceae	Stem	19	0.039 g
		Salicaceae twig	Charcoal	1	0.002 g
FS 507	2b (Floor Zone)	*Acer negundo*	Charcoal	20	0.856 g
FS 508	2b (Floor Zone)	Salicaceae	Charcoal	20	0.459 g
FS 509	2b (Floor Zone)	Salicaceae	Charcoal	20	0.026 g
FS 514	2b (Floor Zone)	Poaceae	Stem	19	0.051 g
		Acer negundo	Charcoal	2	0.007 g
		Sarcobatus vermiculatus/ Allenrolfea occidentalis	Charcoal	6	0.057 g
		Artemisia spp.	Charcoal	1	0.002 g
		Salicaceae	Charcoal	2	0.002 g
FS 655	2a (Floor 1)	*Salix* spp.	Charcoal	50	1.676 g
FS 697	2a (Floor 1)	*Phragmites australis*	Stem	28	0.192 g
FS 808	2b (Post 1)	*Acer negundo*	Charcoal	50	5.614 g
FS 834	2a (Adobe 2)	*Phragmites australis*	Stem	-	n/a*
FS 836	2a (Adobe 2)	*Juniperus* spp.	Charcoal	3	0.127 g
FS 840	2a (Floor 1)	Asteracea	Charcoal	1	0.021 g
		Sarcobatus vermiculatus/ Allenrolfea occidentalis	Charcoal	3	0.116 g
FS 843	2a (Floor 1)	*Juniperus* spp.	Charcoal	50	14.076 g
FS 844	2a (Floor 1)	*Artemisia* spp.	Charcoal	41	0.201 g
FS 849	2a (Floor 1)	*Phragmites australis*	Stem	1	0.001 g

Table 5.1, cont'd.

Specimen No.	Component (Feature)	Species	Part	Ct.	Weight
		Artemisia spp.	Charcoal	27	0.160 g
FS 883	2a (Floor 1)	*Phragmites australis*	Stem	-	n/a*
FS 890	2a (Floor 1)	*Phragmites australis*	Stem	7	0.154 g
		Salix spp.	Charcoal	43	0.407 g
FS 903	2b (Floor 2)	*Salix* spp.	Charcoal	49	1.012 g
		Sarcobatus vermiculatus/ Allenrolfea occidentalis	Charcoal	1	0.012 g
FS 914	2b (Floor 2)	*Acer negundo*	Charcoal	50	9.179 g
FS 915	2b (Floor 2)	*Phragmites australis*	Stem	-	n/a*
FS 929	2b (Floor 2)	*Acer negundo*	Charcoal	44	21.344 g
		Sarcobatus vermiculatus/ Allenrolfea occidentalis	Charcoal	6	0.059 g

* *Species identified in field; not described in Appendix A*

and within 10 cm of Floor 1 (and in which case orientation was commonly at some non-horizontal angle), or 3) positioned horizontally, vertically, or diagonally at a depth consistent with the surface of the adjacent Floor 2. The two exceptions to this pattern were the large fragments of burned wooden beam found in the modern hearth beneath the historic rockpile and a cluster of charcoal fragments in the upper fill (FS 300–302, field ID: F15), about 9–11 cm b.s. The latter was a sparse cluster of smaller fragments than encountered elsewhere and was the only non-bone carbon recovered from the uppermost, presumably latest component in the excavated areas.

Other notable charcoal concentrations include FS 929 (field ID: F36; Figure 5.16), which consisted of a large charred beam, about 20 cm long and 5 cm in diameter, oriented E–W with its lower end overlying Floor 1 and the upper end overlying Floor 2. No posthole molding or soil discoloration was evident around this charcoal. When removed, the largest section was cut with a trowel, revealing the wood to have been softened by ants. This appears to be a structural beam that collapsed inward and downward from a wall or post set in Floor 2 (the exterior surface) into the

Figure 5.16. Two exposures of charred beam (FS 929), excavated to show angle of deposition from surface of Floor 2, at right, downwards into floor zone over Floor 1 at left. The two exposed portions were contiguous through the intervening unexcavated area shown here.

recessed pit of Floor 1. Another large charcoal fragment (field ID: F41), rested at one end on Floor 2, angling slightly upward to the north, and parallel with the boundary at which Floor 1 tapered off. This specimen might represent a section of the structure's wall.

Many charcoal patches in the fill above Floor 1 appeared in a parallel linear arrangement, with the largest pieces appearing to radiate away from the location of Adobe Concentration 1 (Figure 5.10*b*). Coupled with the impressions of structural wood interlaced with sticks and grasses visible in preserved adobe fragments (Figure 5.14), the overall appearance of this debris is suggestive of jacal architecture, with larger beams of what Puseman identified as box elder (*Acer negundo*), juniper (*Juniperus* spp.), and cottonwood (Salicaceae) cross-woven or covered over with smaller branches of willow (also Salicaceae), greasewood or iodine bush, common reed (*Phragmites australis*), sagebrush (*Artemesia* spp.), asters (Asteraceae), and grasses (Poaceae). Taken collectively, these are presumed to be the walls and roof of a single structure that burned and collapsed, in the process also baking patches of a mud covering into hard-fired adobe. Some portions of the charcoal recovered from Floor 1 might also represent the burning of wood or other plants for fuel.

Posthole

A single posthole (field ID: F32; Figure 5.17) was identified in association with Floor 2, consisting of a lighter brown fill than the surrounding sediment and partially ringed with unfired, light-coloured adobe. The feature was 11 x 14 cm in diameter. Within this post mold were a rectangular wedge of fire-cracked rock and a 9 cm-wide, 5.8 cm-high section of charred beam angled upward and to the southwest. The beam, so oriented, would have extended from the exterior surface over Floor 1.

Figure 5.17. Charred post (FS 808) set in adobe post-mold (F32) in surface of Floor 2. FCR appears to have been used as wedge. Floor 1 is at depth of excavation to left, though no clear boundary was defined.

Flotation of bulk sediment from this feature yielded additional macrofloral elements, which Puseman (2015) has reported included "several chunks of *Acer negundo* charcoal, again reflecting a post made from box elder wood. A single small piece of greasewood charcoal, a moderate amount of charred *Phragmites* stem fragments, a calcined bone fragment, a few uncharred bone fragments, and a few lithic flakes likely reflect remains on the Feature 42 [Floor 2] surface… that filled the post mold." Noting the presence of a rock wedge in the posthole, it is unclear whether these additional trace materials are from contemporary midden deposits also used to fill the posthole, were incorporated into the adobe covering parts or all of the structure, or fell into a partially emptied post mold after the beam and structure had burned.

Pits

Two amorphous soil-stain features were observed during excavation, neither having a direct association with the interior floor of the structure. Similar small discoloured features with roughly circular or "irregular" outlines and shallowly basined, excavated profiles were described as possible storage or rubbish pits at the Levee site; the designation is tentative, as the features contained scant faunal remains and were otherwise generally devoid of cultural material (Fry and Dalley 1979:15, 29–30). The designation as possible refuse pits is followed here.

One such feature at Chournos Springs (Pit 1, field ID: F39) was exposed 15 cm beneath the depth of Floor 2 and about 80 cm beyond the lateral extent of Floor 1; it thus appears to be a situated in the Archaic-aged deposits that the pit house was dug into. It consisted of a scatter of FCR and a roughly circular distribution of grayish-brown ashy silt, roughly 25 cm in diameter. The feature was shallowly basined, and several pieces of FCR were found in the fill. No large pieces of charcoal suitable for radiometric dating were identified during excavation, but a bulk sediment sample was collected. A flotation sample yielded a single charred goosefoot (*Chenopodium* spp.) seed fragment, while minuscule charcoal fragments indicate greasewood or iodine bush, sagebrush, and willow were burned as fuel. Small amounts of calcined, charred, and uncharred bone and lithic microdebitage were also recovered from the flotation sample (Puseman 2015).

The second such feature (Pit 2, field ID: F40) consisted of an amorphous concentration of grayish sediment associated with FCR and charcoal specks. Its upper surface was consistent with the level of Floor 2, but no hard-packed sediment was observed around its upper margins. When sectioned, charcoal flecks were observed to greatly increase with depth, extending in a basin shape nearly to the depth of Floor 1. Again, however, no large fragments were observed during excavation. Fragments collected from bulk sediment flotation were identified as greasewood or iodine bush and saltbush (*Atriplex* spp.). Flotation also yielded a macrofloral sample containing one charred goosefoot seed and one charred juniper seed, as well as five charred caryopses from small-seeded grasses (Poaceae C). In addition, numerous small fragments of calcined, charred, and uncharred bone, as well as small pieces of FCR, insect chitin fragments, and lithic microdebitage may indicate that the feature contains clean-out debris from a nearby thermal feature, perhaps discarded from the adjacent structure (Puseman 2015).

Interpretation of structural features

Given the limited scope of testing at Chournos Springs during the brief 2013 and 2014 field seasons, the discovery of an intact buried floor with structural components was serendipitous—more so given that these lay outside Depression 1, where it had initially been hoped such features might be encountered. With a research strategy focused on the detailed recovery of a vertical sequence of cultural material including from the overlying fill, however, only a small portion of the structure was excavated. A consequence is that interpretation must be made from an only partially exposed structure, with its full shape, features, and dimensions unknown.

Observed attributes include a prepared, packed earth floor (Floor 1) that tapers off to the margins, burned structural beams, and mud pressed over thatching (i.e., wattle-and-daub, or jacal). The relationship between a single exterior post hole and charred beams on an exterior surface (Floor 2) to the intramural Floor 1, excavated to a depth of 10–14 cm, has already been noted. The presence of vertical pit walls and a resulting narrow rim around the interior perimeter of the structure is for the most part inferred; a horizontal soil discontinuity noted adjacent to the tapering limit of Floor 1 in excavation unit 500.5 N 496 E (Figure 5.10) may represent the only observed portion of the pit's margins. Horizontally and diagonally oriented charred beams, sticks, and reeds both on and above the slightly recessed Floor 1, and extending over an approximately 30-cm area beyond Floor 1's margins at the height of Floor 2, are coeval (see discussion of dating below). These show the aboveground structure to have been wood framed and thatched, its burning and collapse filling the pit. Mud-plastering is indicated by the observation of adobe patches that variously baked into large stick- and beam-impressed clumps when the structure burned, degraded into pebble-sized fragments, or melted. Not enough adobe was observed during excavation to account for the covering of an entire structure. Whether mud plastering and other earth covering was discontinuous, has been imperfectly preserved, or is simply indistinguishable from the overlying fill remains undetermined.

A number of options have been considered in defining this structure. The possibility of a simple surface structure (i.e., a wickiup or brush hut) is precluded by the presence of adobe and distribution of charred beams and other material on both an upper rim and subterranean (albeit only shallowly so) interior surface. The excavated floor's lateral extent is unknown, and the presence or absence of common elements of a residential structure such as a central hearth, sub-floor storage pits. In their absence, the structure may be perceived as an open-walled, roofed shade structure, or ramada. Both the presence of a shallowly subterranean floor and adobe also weigh against such an interpretation as informal architecture. The bulk of the features observed correspond with the large, square pit houses, from 5 to 7.5 m across with prepared floors, postholes, and mud plaster featuring the impressions of wood and grass thatching, that are typical of the Levee phase of the Great Salt Lake Fremont, dated between AD 1000 and 1350 in the Bear River wetlands northeast of Promontory Point (Fry and Dalley 1979). A residential use of the structure is also supported by the frequency of cultural material found on the surface of the excavated portion of Floor 1. The quantity of quartz sand-tempered ceramic sherds (n = 101, discussed below), not counting the overlying fill, corresponds with the number of Great Salt Lake Gray sherds found in completely excavated residential structures from the Bear River area (Janetski et al. 2012:fig. 2.7).

This type of shallowly semi-subterranean structure, with postholes set at ground level outside the excavated interior, also generally corresponds with the pit houses of the Great Salt Lake Fremont described by Judd (1926) at Willard and by Steward (1933) at Grantsville, at the south end of the lake. Figure 5.18 shows Judd's conceptualization of what such structures would have looked like from the exterior, while Figure 5.19 shows Steward's illustration of a similar one in cross-section. Both illustrations show square structures, but round-walled ones were also made in the Great Salt Lake area (Judd 1926; Fry and Dalley 1979). The supposition of an entrance through the roof of the structure is conjectural: at the Levee and Knoll sites in the Bear River

Figure 5.18. Artist's rendering of earth lodges on Great Salt Lake shore at Willard (Judd 1926:4).

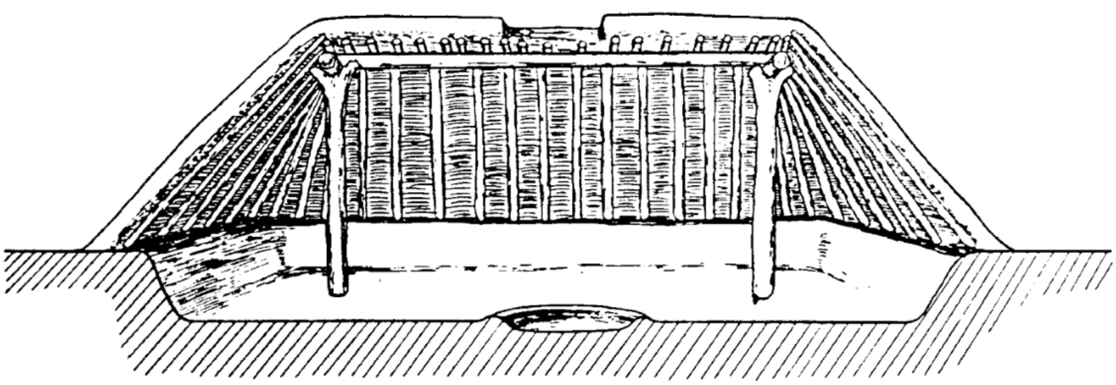

Figure 5.19. Grantsville-type pit house structure with central hearth, interior support posts and crossbeams, and wattle-and-daub walls angled inward from the exterior surface level. Adapted from Steward (1933) by Spangler (2002:fig. 2.15). Note the possible presence of an interior ledge at ground level around the perimeter of the structure.

wetlands, earlier structures (before AD 1000) were rounded and had vestibules and access ramps, while trenches extended from the later structures, serving either as entrance crawlways or ventilator tunnels (Fry and Dalley 1979:5). Testing at Chournos Springs has not been so extensive as to ascertain the presence or absence of such features.

Judd's account of the single intact mound near Willard that he excavated in 1915 is consistent enough with several of the observed features at Chournos Springs to merit repeating at length here, while adding additional insights that may help complete the picture of the partially excavated structure:

> [A]t a depth of 2 feet 6 inches (0.76 m.) there was discovered a well-defined earthen floor, the surface of which was hard, smooth, and blackened through continued use. As the work of exposing this pavement progressed quantities of burned roof clay were encountered, bearing impressions of logs, willows, and grass. Most of these were uncovered at or near the floor level, but others occurred between that and the surface.... Fragments of charred poles, from 1 to 4 inches (2.5–10 cm.) in diameter, lay across [a central] fire pit or sloped up from it upward and outward toward the surface. Over one group of such fragments and resting on the north edge of the basin was a charred mass of coarse grass and reeds (*Phragmites communis* Trin. and *Calamagrostis Canadensis* Beauv.); above this were portions of burned and smoke-stained roofing clay, the impressed side usually being down. These chunks ranged in thickness from 2 to 6 inches (5–15 cm.); a few bore marks on each side showing that the plastic mud had been forced between the timbers at the time of building.... [I]t seems possible, tentatively, to restore such a dwelling as that represented in the mound at Willard. The four upright and perhaps notched posts supported crosspieces upon which lay lighter poles and split timbers. Over these were spread, in succession, layers of willows, reeds, or grass, and mud, the latter fitting closely about the two former and retaining their impressions

perfectly after fire or natural decay had removed all other traces of the vegetable matter. The relatively small, flat portion of the roof between the uprights probably contained a smoke vent for the fireplace directly beneath.

That the sides of this lodge sloped from the ground to the cross-pieces supported by the flour central posts seems obvious from close examination of the floor. About the fire pit and within the square formed by the four pillars the earth had been tramped hard and smooth through constant use. Elsewhere the floor was traceable in indirect proportion to the distance from its center, and in no place could it be followed with certainty more than 7 feet (2.1 m.) from the rim of the fireplace. Although no marks were found which might indicate the former resting place of inclining wall timbers, the mere fact that the floor, so distinct in the middle, became less plain toward its borders, suggests that this ancient structure was… in outward appearance not unlike the earth lodges of certain western tribes, or, for example, the familiar winter hogan of the Navaho….

The northern Utah structures were erected over a cleared space which may have been slightly below ground level [in a footnote: no indications of earthen walls or embankments, or of masonry of any sort, were observed in the mounds trenched at Willard], while the true pit houses were largely subterranean. These latter were not infrequently as much as 5 feet in depth. [In instances at Mesa Verde and elsewhere, they] are each represented as having had a conical roof supported by poles which extended at an angle from a low encircling bench to a common meeting place above the middle of the dwelling…. [T]he supposition is that access was gained by means of steps or a ladder leading through an opening in the roof. In the shelters at Willard no trace of a doorway could be found. The entrance may have been at or near the ground level, or with equal plausibility it may have been through the flat roof

> section above the fireplace, in which latter case it would have served also as a smoke vent. [Judd 1926:6–9]

In summary, similarly to the structure at Chournos Springs, Judd first encountered a well-defined, hard-packed floor. Chunks of adobe were found either laying directly on this floor or slightly above it, usually with stick, grass, reed, and beam impressions on the downward-facing side, suggesting a wattle-and-daub structure that collapsed inward when it burned. The floor was traceable for several feet east and south of where it was first encountered during trenching, at which point it became indistinct, without only scant trace of an earthen wall. Absent in the excavated area at Chournos Springs are any large postholes in the floor of the structure or a central, adobe-lined hearth. However, with the Willard structure described by Judd having a radius of 2.1 m from its center and Levee phase structures ranging 2.5–3.75 m from center to edge, the center of the structure defined by Floor 1 was probably never reached (this probably lies in the unexcavated area directly south or southwest of the initial test trench from 2013).

The square- or round-framed, semi-subterranean, earth-covered pit house is not unique to the Great Salt Lake area. The pattern of shallowly excavated, rectangular and circular pit houses with four support posts is ubiquitous on the northern Colorado Plateau, particularly in the Uinta Basin (for a full review, see Spangler 2002). Similar structures to those seen at Granstville were reported by Steward at four sites in the Uinta Basin, on the Uintah River north of Fort Duchesne, as early as 1931 (Steward 1933:32–33). Slab-lined houses not seen in the northeastern Great Basin are found farther south, in Nine-Mile Canyon and elsewhere in southern Utah, but "[t]he shallow pit lodge" appears in "both western Utah and the Uintah Basin" (Steward 1940:468–469). Other noteworthy examples in the Uinta Basin reviewed by Spangler (2002) include the Goodrich Site

(42UN271), the Flattop Butte Site (42DC48), and the Felter Hill Site (42DC2), where testing of 27 circular depressions revealed shallowly excavated pit houses with compacted floors (Shields 1967:7–14).

Surveys of the eastern and western portions of Dinosaur National Monument also identified numerous pit house sites (Breternitz 1964, cited in Spangler 2002:64), the most notable being Caldwell Village (42UN95), perhaps the archetypal Uinta Fremont site (Ambler 1966). There, generally circular structures 4–9 m in diameter and 20–69 cm deep had clay-rimmed or basined central hearths, four interior support posts, and subfloor storage pits. Structures were dug into sterile sediment, and floors were smooth, compacted, and sometimes lined with clay. In a now familiar pattern, burned debris in the fill overlying these prepared floors

> indicates that the above ground portions of the walls were formed of closely spaced poles and sticks covered with clay. The roofs were apparently constructed with large beams, covered with poles, brush, grass and clay. Additional earth was probably placed over the full structure. [Ambler 1966:24]

Only a single date was obtained from a total of 22 pit houses at Caldwell Village, yielding an age of 1430 ± 70 BP (ca. 640 cal. yr. AD), which Ambler (1966:66) suspected was too early. This date is well within the range, however, of a continuous Fremont presence in the Uinta Basin between AD 200 and 1000 (Truesdale 1990, cited in Spangler 2002:65).

Steward felt that the shallow pit houses of the Great Salt Lake and Uinta Basin were "very similar to the jacal lodges of the Early Pueblo Period in southwestern Colorado," thus perhaps indicating a direction of diffusion for the structure form (Steward 1940:468–469). This interpretation is challenged somewhat by the widespread occurrence of semi-subterranean pit houses dating to the Early and Middle Archaic (ca. 6,000–4,500 BP) farther up the Green River, from the Uinta Mountains and Flaming Gorge through much of the Wyoming Basin to the north and east (Eakin 1987; Harrell and McKern 1986; Loosle and Johnson 2000; D. McGuire et al. 1984), though greater temporal and stylistic continuity can perhaps be found with the Puebloan forms.

Judd (1926) correctly observed that examples comparable to the shallow pit house style can be found among ethnographically attested earth lodges including Diné hogans, but it should be noted that the semi-subterranean structures attributed to the Diné of the 18th and 19th centuries include both round forms and square, with or without stone slab walls around an excavated pit, with conical roofs or supported crossbeams, and with or without earth coverings (Hurt 1942; Page 1937)—an array of variability comparable to virtually all the types seen in the Formative Great Basin and Colorado Plateau, lacking only adobe coursing.

Comparability also exists between the shallow pit houses of the Great Salt Lake and Uinta Basin to the later pit houses of the Dismal River Phase, especially as seen on the Central Plains, with interior hearths, vertical interior support posts with crossbeams arranged across their tops, and leaning walls angled inward from the exterior surface level to the crossbeams and covered with grass, brush, and earth (Aikens 1966:84; Gunnerson 1956). Again, however, a range of variability exists within Dismal River structures of different regions (Gilmore and Larmore 2012; see Chapter 2).

Dating and cultural components

AMS ^{14}C dating results from Chournos Springs are presented in Table 5.2. Radiocarbon concentrations, reference samples, and additional notes on individual specimens are listed in

Table 5.2: AMS radiocarbon dates from Chournos Springs (42BO1915)

FS #	UCI AMS #	Type (Species)	Component	^{14}C Age (BP)	Cal. Yr. AD[2]
300	131082	Charcoal (Greasewood/ iodine bush)	D,[1] Upper Fill	105 ± 20	1688–1730 (26.7%) 1809–1927 (68.7%)
313.2	143679	Bone collagen (Lagomorph)	A,[1] Upper Fill	1705 ± 15	259–282 (15.1%) 323–392 (80.3%)
449	131083	Charcoal (Greasewood/ iodine bush)	B1, Floor 1	840 ± 20	1164–1250 (95.4%)
453	131084	Charcoal (Box elder)	B1, Floor 1	850 ± 20	1158–1247 (95.4%)
469	131085	Charcoal (Grass)	B1, Floor 1	825 ± 15	1180–1260 (95.4%)
506	131086	Charcoal (Grass)	B2, Floor Zone	835 ± 20	1165–1255 (95.4%)
508	131087	Charcoal (Willow)	B2, Floor Zone	975 ± 20	1016–1152 (95.4%)
509	131088	Charcoal (Willow)	B2, Floor Zone	800 ± 20	1211–1270 (95.4%)
702	143313	Fruit endocarp (Hackberry)	D,[1] Upper Fill	-850 ± 150	1957–1958 (6.7%) 1990–2004 (93.3%)
808	143311	Charcoal (Box elder)	B2, Post 1	1015 ± 15	990–1030 (95.4%)
834	143314	Charcoal (Reed)	B1, Adobe Conc. 2	890 ± 20	1045–1095 (33.9%) 1119–1214 (61.5%)
848	143318	Fruit endocarp (Hackberry)	D,[1] Upper Fill	-2600 ± 120	1962 (12.5%) 1973–1977 (87.4%) 1978 (0.1%)
883	143317	Charcoal (Reed)	B1, Floor 1	1060 ± 15	907–915 (2.0%) 968–1020 (93.4%)
915	143312	Charcoal (Reed)	B2, Floor 2	985 ± 15	1016–1047 (77.2%) 1092–1122 (15.8%) 1140–1148 (2.4%)

[1] Recovered from fill at depth of Component C1, but dates indicate samples were intrusive in this context.
[2] Modern radiocarbon dates calibrated with the CALIBomb Radiocarbon Calibration program (Reimer et al. 2005) using default smoothing and resolution values and the Northern Hemisphere Zone 2 calibration curve for the period 1950–2010 (Quan et al. 2013).

Appendix B. Charcoal samples associated with the two compacted occupation surfaces (Floors 1 and 2) were a primary focus, while bone collagen and macrobotanicals from the overlying sediment were also dated. It was hoped that these samples would yield a full spectrum of dates from the Fremont-Promontory transition; however, no dates representing the later period of occupation were successfully obtained. The dates from the upper fill were consistently either from displaced Archaic material (one sample) or of recent and likely natural origin (three samples).

Dating was conducted by John Southon at the W.M. Keck Carbon Cycle Accelerator Mass Spectrometry (KCCAMS) Laboratory at the University of California, Irvine. Initially, ten samples were selected from the 2013 excavations, including seven of charcoal and three of bone. None of the bone samples, all recovered from the upper midden deposits, yielded sufficient collagen for analysis after ultrafiltration—a process used at KCCAMS and the Oxford Radiocarbon Accelerator Unit (ORAU), which dated the perishable items from the Promontory Caves, to ensure that the dated specimen is free of possible contaminants (Beaumont et al. 2010; Brock et al. 2007; Brown et al. 1988; UCI-KCCAMS 2011; for an explanation of collagen degradation through bone diagenesis, see Sealy et al. 2014).

Ten additional samples were submitted in 2014, four of them charcoal, two the permineralized endocarps of hackberry (*Celtis reticulata*) fruit, and the remaining four of pre-gelatinized bone collagen, prepared by Joan Coltrain at the Department of Anthropology, University of Utah. Once again, with the exception of one sample, insufficient quantities of collagen for dating remained after ultrafiltration.

For those charcoal samples that could not be identified to the species level in the field (a category of which is solely represented by large pieces of charred *Phragmites*), a portion was also submitted to Kathryn Puseman for identification. The samples were divided prior to submission, and only the largest individual fragments were submitted for dating. In some cases, multiple species were present in identified charcoal samples (Table 5.1; Puseman 2015), but one species is

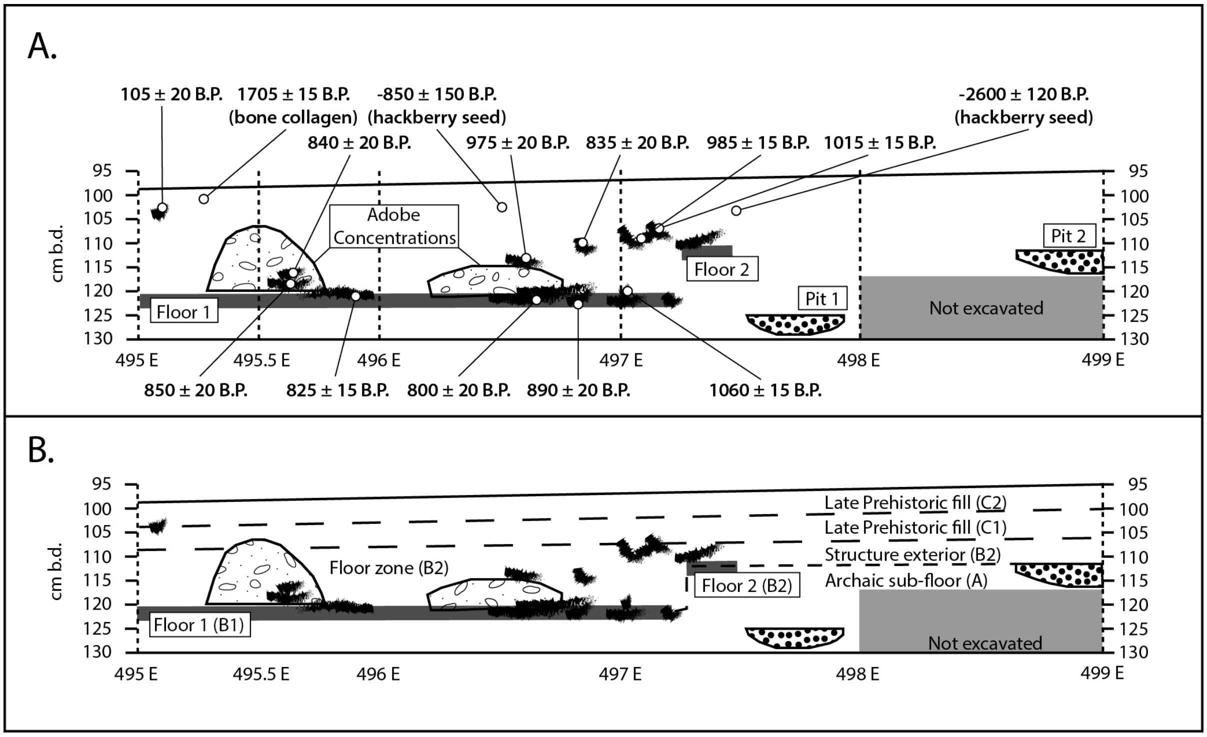

Figure 5.20. Extrapolated profile (view north) of main excavation area showing a) depth of dated samples in relation to key cultural features and b) relative depths of interpreted cultural components (Component D, only sporadically represented, is not shown).

greatly predominant in each such sample and most likely corresponds with the large fragments submitted for dating.

An extrapolated profile showing the relative depths of the dated samples in relation to principal cultural features is shown in Figure 5.20*a*. In Figure 5.20*b*, the relative depths of the cultural components at Chournos Springs are shown, drawn from the dated evidence and interpretation of cultural features. These components are described below.

<u>Component A (Archaic)</u>

Sparse Archaic deposits (Component A) form a basal layer of cultural occupation, interpreted as ephemeral debris from short-term use of the site area, in the accretional loess and alluvium of the deepest excavated deposits (where excavated into by Floor 1, >24 cm b.s., and elsewhere below Floor 2, >16 cm b.s.). Only one intact cultural feature—an FCR and ash concentration at a depth of 24 cm b.s. (Pit 1)—was observed in this component. Minuscule charcoal fragments (<100 mg) associated with this feature have not yet been submitted for AMS radiocarbon dating. No other organic samples viable for dating were recovered at these depths.

Component A was not intensively investigated in this study. Owing to time constraints and a prioritization of deposits potentially associated with the Formative-Late Prehistoric transition, Floor 1 was the maximum depth exposed through much of the excavation area. Earlier deposits remain for the most part unexcavated. The few exceptions are the trench through Depression 1, the three test units, and sediment parallel to but beyond the lateral extent of Floor 1. Likewise, no attempt was made to select samples to date this component at this stage of research. The charcoal recovered from flotation of bulk sediment from Pit 1 might be a viable candidate for dating of an *in situ* feature from this period in future.

One bone sample from the upper fill (5–10 cm b.s., FS 313.2), in deposits presumed to be associated with Component C1, provided an aberrantly early date of 1705 ± 15 ^{14}C yr. BP. The calibrated date range for this specimen is in the third or fourth century AD, at the terminal end of the Late Archaic period. It was recovered from screened sediment adjacent to the upper portion of Adobe Concentration 1 on the southern edge of Depression 1 and was selected for dating owing to the sheer paucity of intact features, charcoal, and even large bone fragments from this depth range that could be dated, despite an abundance of other cultural material. It is not suspected that the early date accurately represents the upper deposits and is instead presumed to have been displaced post-depositionally. This disturbance may simply have been a result of rodent burrowing, as younger materials (hackberry seed endocarps) were also found at this depth range. If the interpretation of the adjacent Depression 1 as a wind-eroded wallow is correct, the displacement of Archaic materials could also be a product of the same bioturbation that created that feature. It is also necessary to consider that the excavation of a semi-subterranean pit house would have resulted in the displacement of a considerable volume of sediment and any buried cultural materials it contained. Some stratigraphic inversion should be anticipated in adjacent areas, or even above it if the excavated fill were incorporated into the earth covering of the structure, potentially making the teasing apart of these deposits a complicated analytical problem.

Table 5.3. C/N stable isotope ratios of Leporidae bone sample FS 313.2, provided by Joan Coltrain (as ARCF 2859) and KCCAMS (as UCIAMS 143679).

Lab Ref #	>30kD collagen yield (%)	$\delta^{15}N$ (‰)	$\delta^{13}C$ (‰)	%N	%C	C/N (wt%/wt%)	$^{14}C/N$ atomic
ARCF 2859		12.8	-14.8	15.4	52.6	2.8	3.2
UCIAMS 143679	14.3	12.6	-15.7	15.4	43.4	2.82	3.29

The bone itself was a medial Leporidae longbone segment, from either a jackrabbit or hare. Collagen from the bone was extracted by Joan Coltrain at the University of Utah and was subsequently submitted to KCCAMS for ultrafiltration and dating. At both stages, stable isotope values for $\delta^{15}N$ and $\delta^{13}C$ were obtained (Table 5.3) showing enrichment of both nitrogen and carbon beyond what would be expected for a herbivore in the eastern Great Basin ($\delta^{15}N$ 3.1 to 9.9, $\delta^{13}C$ -20.0 to -16.9; Ugan and Coltrain 2012:1403). Elevated carbon isotope values are indicative of consumption of plants that use the C_4 photosynthetic pathway for carbon fixation (Peisker and Henderson 1992), uncommon in the Great Salt Lake area with the exception of maize. However, maize consumption does not typically also result in nitrogen enrichment unless grown in soils fertilized with human or animal waste. An alternative explanation is a diet dependent on the consumption of saltbush (*Atriplex* spp.), which would yield both enriched ^{15}N and ^{13}C carbon values (Joan Coltrain, pers. comm., April 2014). Both burned and unburned seeds, as well as charcoal from species of *Atriplex*, plants that prefer arid, alkaline soil, were identified in flotation and charcoal samples from Chournos Springs (Puseman 2015), suggesting that patches of saltbush were accessible in the site area.

Component B (Formative)

The Archaic cultural deposits underlie an occupation surface dating to the terminal Fremont era (Floor 1, 21–24 cm b.s.). Ten dates from this surface, from large charcoal fragments in the immediately overlying fill, and from a second, adjacent hard-packed surface (Floor 2, ~13 cm b.s.) on which were found numerous charcoal scatters and a posthole, are broadly synchronous, with many dates from the higher deposits being older than those recovered directly from the lower floor. The lower surface can be identified as the floor of a burned and collapsed residential structure, most likely a shallowly subterranean pit house, designated here as Component B1. Floor 2 is identified as the contemporary exterior surface, delineating part of the structure perimeter. The infilled sediments, or floor zone above Floor 1 up to the level of Floor 2, and artifacts at the depth of Floor 2 itself, stratigraphically superimposed over Component A, are termed Component B2 (~13–23 cm b.s.).

In the absence of distinct paleosols within the B horizon sediments, the depth of the upper compacted surface constitutes a provisional intermediary boundary between older deposits below (Component A), into which the pit house is intrusive, and younger deposits above (Component C), which are considered here as time-transgressive accretional zones rather than individual occupation events.

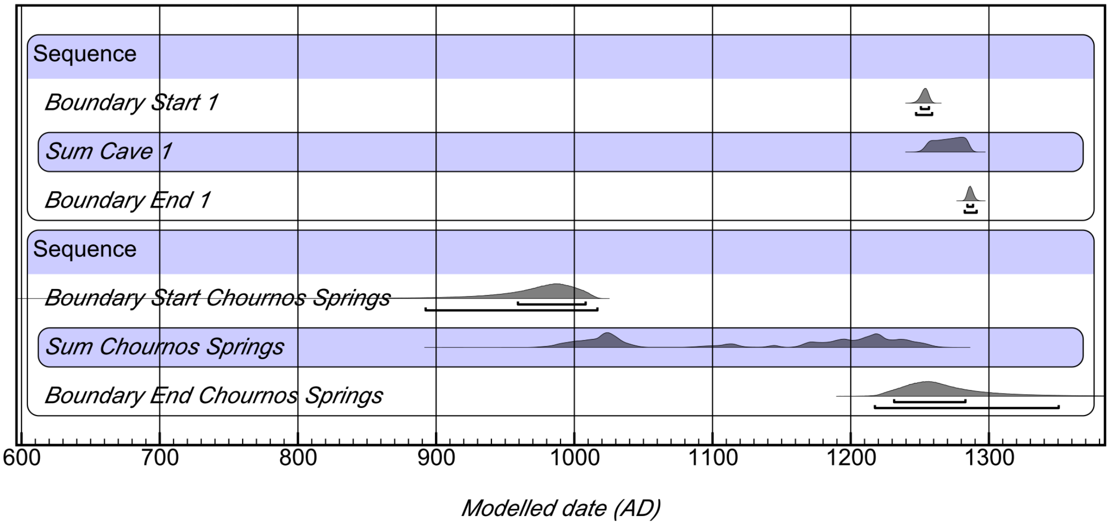

Figure 5.21. Bayesian modeled dates for Promontory Cave 1 and Component B at Chournos Springs (Yanicki and Ives 2017; figure courtesy Christopher Bronk Ramsey).

Bayesian modeling of the dates for Component B provided by Christopher Bronk Ramsey of the ORAU (Figure 5.21) shows two distinct peaks in activity.[21] Older dates in this series, ranging from about 980–1040 cal. yr. AD (FS 508, 808, 853, and 915), are derived from the structure periphery and the overlying fill. Some of these dates represent larger beams that were either affixed in the contemporary exterior surface or collapsed inward when the structure burned, indicating an initial period of construction. As some of the specimens in this grouping are from longer-lived species (box elder and willow), it might appear that old wood was used or older growth from the core of large beams was dated, skewing this cluster to a period before actual construction. However, two early dates in this sequence are from reed (*Phragmites australis*), a short-lived species, suggesting this early group of dates is an accurate *terminus post quem* for the structure's construction.

Younger dates in the Component B series, clustering between 1158 and 1270 cal. yr. AD, come from directly on the lower occupation surface or from the fill above it. These samples consist of greasewood or iodine bush, willow, and box elder, as well as charred fragments of grass and reed stems, and likely represent debris from ongoing maintenance of the walls and roof, and perhaps even from residential activity (i.e., matting, basketry, etc.). The short lifespan of many of these botanicals and their close congruence in age offers a reasonable *terminus ante quem* for Component B in the mid-13th century AD. There is a two- to three-century gap between construction and terminal occupation of the structure, with only one date falling in the middle of the sequence (FS 834, 890 ± 20, from Adobe Concentration 2), which when calibrated potentially overlaps with both the earlier and later date clusters. One possible explanation for the broad gap in dates is that refuse was not let to accumulate, and the structure floor was periodically cleaned. The possibility that the structure had a more complicated history of construction and use, as at the Levee site where an initially rectangular pit house was later superimposed by a circular-shaped one (Fry and Dalley 1979:22-24), is more difficult to ascertain at this time.

For comparison, the boundary start and end dates for the occupation of Promontory Cave 1, modeled from the 95 dates from recently excavated samples, are also shown in Figure 5.20. Median calendric dates for these dates ranging from AD 1220–1321 show considerable overlap with dates from the Chournos Springs sample; this overlap is even greater when the margin of error for individual early dates is considered. Smoothing out this uncertainty, the Bayesian modeled peak occupation of the caves between AD 1247–1291 almost entirely overlaps the prospective end boundary for the structure at Chournos Springs—that is, the time at which the last dated material was added to it—at the one-sigma (68%) tolerance interval, and it fits in its entirety at the two-sigma (95.4%) interval. The structure thus appears to have been abandoned at the time the caves were inhabited. Abundant charcoal, fire-hardened adobe, and evidence of collapsed structural beams within the pit indicate it was destroyed by fire.

Component C (Late Prehistoric)

After the pit house burned and collapsed, Chournos Springs continued to be occupied. Draped over the entire site area is midden-like debris containing a mix of materials bearing similarities both to items from the Formative period and to sites elsewhere in the Great Salt Lake area dating to the Late Prehistoric period. These are described in greater detail in the following sections and in Chapter 7.

Unfortunately, great difficulty was encountered in obtaining a series of dates that could bracket this later period of occupation. Only one possible cultural feature was observed in the upper fill, a light charcoal scatter (field ID: F15). On the possibility that this scatter might represent an ephemeral hearth (despite the absence of ash or a lens of oxidized soil), one charcoal sample from this feature was dated (FS 300). The wood was either iodine bush (*Allenrolfea occidentalis*) or greasewood (*Sarcobatus vermiculatus*), with many knotted areas and some vitrified fragments (Puseman 2015). It is unclear what causes the molten, glassy appearance of vitrified charcoal, though high temperatures and burning green wood are suspected contributing factors (L. McParland et al. 2010). Lightning strikes causing brushfires on the flats are common in recent memory (George Chournos, pers. comm., 2013), and such a strike, burning buried roots, may explain the presence of such unusual charcoal, and of such recent age, at this depth. This charcoal sample appears to be representative neither of cultural activity nor of the age of the surrounding deposits.

With few other options, several other samples from uncertain context were selected for dating. Four of these were large faunal bones or bone fragments not associated with a specific feature, but potentially representative of the general age of the midden. Only one, discussed in Component A above, yielded sufficient quantities of ultrafiltered collagen for a reliable radiocarbon date that proved to be of Archaic age.

Two permineralized western hackberry (*Celtis reticulata*) endocarps—the stony pit surrounding the seed of the hackberry fruit—were dated, these being screen finds of only general provenience within the upper midden deposits. They each yielded trace amounts of carbon (0.021 and 0.025 mg) that contained enriched levels of ^{14}C, dating to the period after the onset of atmospheric thermonuclear testing (John Southon, personal communication, 2014). Permineralized hackberry endocarps have previously been found to accurately reflect other dates from archaeological and post-bomb contexts (Y. Wang et al. 1997). Even though more recent work by Jay Quade et al. (2014:S21) has found younger dates are obtained from hackberry endocarps than from associated charcoal (ca. 130 ^{14}C years on samples about 10,000 years old), this small but consistent contamination, likely caused by the addition of calcite or recrystallization of aragonite to calcite within the permineralized endocarp, is insufficient to account for the young dates obtained from these samples. They thus appear to also be a product of bioturbation, although the source of the hackberries remains uncertain: the nearest hackberry tree observed was at some distance up the mountainside in Brushy Canyon.

In the absence of firm radiocarbon dates, typological artifact similarities and stratigraphic superposition provide a basis for interpreting the upper deposits to represent hunter-gather occupation debris from the Late Prehistoric period, potentially contemporaneous with the occupation of the Promontory Caves, postdating it, or both. If the dates from Component B indicate the structure was abandoned contemporaneously with the caves' occupation, it would follow that these later cultural deposits in the upper fill at Chournos Springs were also left either while the caves were occupied or in the period afterwards. Using the terminus ante quem of the dates from the structure as a guide, the upper midden-like deposits must date from the early- to mid-13th century and later: that is, from the terminal Formative period, from the Late Prehistoric, or both.

A lack of clearly defined occupation surfaces, paleosols, or features and the likelihood of periodic aeolian erosional impacts on the site may mean that the mixing of multiple occupations cannot be entirely ruled out. The limited vertical development of sediment in the upper fill nevertheless allows subdivision into two subcomponents: C1 immediately above B2 (~5–13 cm b.s.) and C2 comprising the uppermost fill (~0-5 cm b.s.). Just as no clear boundary separates C1 from C2, the horizontal boundary between C1 and B2 is for the most part arbitrary, and some admixture of cultural materials from disparate occupations is possible.

<u>Component D (Historic)</u>

A fourth, ephemeral Component D associated with historic ranching activity is also present but is only identified from a single modern rockpile and hearth. While surface disturbance from grazing animals is likely, there is no distinct layer of historic debris over the site area, and such debris is scarce.

Summary of excavated areas

Throughout the areas excavated at Chournos Springs, poorly sorted strata bearing extensive cultural materials overlie well-defined occupations dating to the terminal Formative period and earlier. The law of superposition alone dictates that these upper cultural deposits should, for the most part, be younger. Although demonstration of this point has proven devilishly difficult within the limited testing so far undertaken, an examination of the cultural materials themselves offers another pathway to bearing this supposition out.

Given both that significant structural elements including adobe features, postholes, and floors were encountered through only minimum testing and that the lateral extent of cultural debris on the surface is extensive, it is also likely that there are additional buried structures in the site area. In the terminal Formative period, and likely long before, Chournos Springs was probably a village. Some mixing of materials through the creation of semi-subterranean structures, periodic cleaning and midden deposition during site occupation, and post-depositional disturbance factors all appear likely to have occurred, complicating interpretation of the site's occupational history.

For comparative purposes and calculations of relative occupation intensity, excavated volumes from the 2013 and 2014 excavations are shown in Table 5.4. Due to time constraints, work in much of the main excavation area stopped once Floor 1 was fully exposed, or once an equivalent depth was reached, leaving Archaic deposits untouched below. At most, excavation in parts of the trench across Depression 1 and in each of the test units reached the rocky upper surface of the alluvial deposits underlying the site area. While no cultural materials were observed within the alluvium, it is unknown when the alluvial fan formed and whether it is interdigitated with or overlies material from earlier Archaic or even Palaeoarchaic occupations that antedate those observed in the upper aeolian deposits.

The components as described above can be applied with confidence only to the main excavation area, where chronological and stratigraphic control was greatest and, whenever possible,

Table 5.4: Volume of sediment excavated from cultural components and arbitrary levels.

Component or Depth Range	Excavated Area (m^2)	Excavated Volume (m^3)	Depth Range (cm b.s.)
Main Excavation Area			
C2	10.25	0.72	~0–5
C1	10.25	1.03	~5–13
B2	9.0	0.67	~13–16/21**
B1	6.5	0.20	~21–24
A	3.0	0.34	>16/24–35**
Depression 1			
Upper (0–5 cm b.s.)	3.0	0.19	0–5
Middle (5–15 cm b.s.)	1.5	0.26	5–25
Lower (>25 cm b.s.)	1.5	0.45	25–85*
Test Pit 1			
Upper (0–5 cm b.s.)	1	0.05	0–5
Middle (5–25 cm b.s.)	1	0.20	5–25
Lower (>25 cm b.s.)	1	0.30	25–55
Test Pit 2			
Upper (0–5 cm b.s.)	1	0.05	0–5
Middle (5–25 cm b.s.)	1	0.20	5–25
Lower (>25 cm b.s.)	1	0.50	25–73
Test Pit 3			
Upper (0–5 cm b.s.)	1	0.05	0–5
Middle (5–25 cm b.s.)	1	0.20	5–25
Lower (>25 cm b.s.)	1	0.10	25–35
Total	16.25	5.44	-

***** Max. depths of individual 0.25 m^2 (50 cm x 50 cm) units in trench ranged between 15 and 85 cm b.s.***

***** Range after slash indicates depth above/below Floor 1.***

material from different cultural features was excavated and analyzed separately. The relative depths of each cultural component in the trench through Depression 1 and the three test units can be judged with a lesser degree of certainty, as excavation proceeded solely through the excavation of arbitrary levels. In the portion of the initial trench that intersected the pit house, where cultural materials were initially recovered from Floor 1 and the overlying fill, a judgement of which cultural component those arbitrary levels are best associated with in the adjoining main excavation area has been made and materials are included in the component-by-component analyses discussed below. Otherwise, cultural materials from the trench and test units are evaluated separately, sorted into Upper (0–5 cm b.s.), Middle (5–25 cm b.s.) and Lower (>25 cm b.s.) levels, which may or may not accurately reflect the Late Prehistoric, Late Prehistoric/Formative transition, and Archaic components observed in the main excavation area. Additional artifacts were recovered from the surface and from spoil piles during wall cleaning, which are not included in the totals for any cultural or arbitrary level.

Material Culture

A comprehensive description of the excavated artifacts and other archaeological materials from Chournos Springs must await a final site report. High-level summaries of several artifact types (lithic debitage, stone tools, incised stones, groundstone, fire-cracked rock [FCR], and faunal remains) are provided here, sorted by component. A more detailed overview of the ceramic assemblage is provided in Chapter 7. Descriptions of individual stone tools and other artifacts are included in the catalogues for each artifact category kept with the collection, the bulk of which was submitted to the Natural History Museum of Utah in Salt Lake City in the spring of 2018. FCR was discarded after being counted, weighed, and described in the lab at the Museum of Peoples and Cultures, Brigham Young University, in Provo, while only a sample of the groundstone objects was retained.

Ceramics

A total of 354 ceramic sherds were collected at Chournos Springs. Of these, 291 were recovered in a controlled stratigraphic setting from the main excavation block, excluding the disturbed depression area, shovel tests, and surface finds. Reviewed briefly here is the stratigraphic differentiation of this assemblage (Table 5.5) and an overview of the key attributes present in each ceramic-bearing component.

Table 5.5: Ceramic temper type frequencies, Chournos Springs

	Main Excavation Area				Depr. 1			Test 1		Test 2			Test 3			
Temper Type	C2 (~0–5 cm b.s.)	C1 (~5–12 cm b.s.)	B2 (~12–21 cm b.s.)	B1 (~21–24 cm b.s.)	Upper (0–5 cm b.s.)	Middle (5–25 cm b.s.)	Lower (>25 cm b.s.)	Middle (5–25 cm. b.s.)	Lower (>25 cm b.s.)	Upper (0–5 cm b.s.)	Middle (5–25 cm b.s.)	Lower (>25 cm b.s.)	Middle (5–25 cm b.s.)	Walls/Spoil	Surface	**Totals**
Basalt	1		3										1			**5**
Calcite	14	27	15		3	1				2		2	1		3	**68**
Calcite, Mixed	10	12	2	1	1	1										**27**
Mica, Mixed	3	3	11	1	3	1	1		1					1		**25**
Opaque Rock			1													**1**
Quartz, Mixed		7	7		1	5	1	1			2			2	1	**27**
Sand	13	15	12	97		2	1		1				3		9	**153**
Sand, Mixed	2	16	14	4	1	2		1					1	1	6	**48**
Totals	**43**	**80**	**65**	**103**	**9**	**12**	**3**	**2**	**2**	**2**	**2**	**2**	**6**	**4**	**19**	**354**

No ceramic materials were recovered from Component A, affirming that the pit house was excavated into aceramic Archaic deposits. To assess the stratigraphic integrity of cultural components defined here, a comprehensive attempt was made to refit all the pieces of the ceramic assemblage by aligning the fracture planes of sherds of matching temper types. This effort yielded refits of 49 sherds into 19 composite pieces, only two of which contained sherds from different strata: one sherd from Component C1 refit with three from Component B1, and two sherds from Component C1 refit with three from Component B2. Despite the observation of substantial krotovinas concentrated on the occupation surfaces, evidence of bioturbation from the dated samples in the upper fill, and the arbitrary nature of the divisions between Components B2, C1, and C2, the refit analysis indicates that excavation strategies successfully mitigated these challenges. While stratigraphic integrity is not perfectly preserved and the component divisions employed here may straddle chronological boundaries to a certain extent, the limited vertical displacement of ceramic sherds allows some confidence to be placed in the assessment of stylistic changes over time.

The largest single concentration of ceramics (n = 103) was found lying flat on the surface of Floor 1. These are almost exclusively tempered with rounded grains of quartz sand (n = 97), a common temper type in Great Salt Lake Gray (D. Madsen 1979). Four more sherds in Component B1 featured a primarily sand temper mixed with small amounts of mica (n = 2) or calcite (n = 2), together with single sherds having primarily calcite and mica temper. Diversity increases in the overlying fill, peaking in Components B2 and C1, with a marked increase in the prevalence of calcite-tempered sherds typically associated with Promontory ware in the Great Salt Lake area (often mixed with lesser proportions of limestone or dolomitic rock, charcoal, quartz, mica, feldspar, or combinations thereof), matched with a sharp decline in the sand-tempered ware seen in Component B1.

Other sherds throughout the site area, including in the upper fill, feature many of the variable tempers commonly attributed to Great Salt Lake Gray ceramics: blends primarily of sand, mica, feldspar, or angular crushed quartz mixed occasionally with lesser proportions of calcite, rhyolite, dacite, charcoal, or shell. In addition, four sherds with an evenly surfaced, buff-slipped grayware and an angular, black basalt temper were recovered. These match descriptions of a more southerly Fremont ceramic type, Sevier Gray (D. Madsen 1979; R. Madsen 1977). One additional sherd had an opaque rock temper that could not be identified through microscopic examination. Two sherds in Component C2 feature faint black-painted lines on their interior surfaces and appear to be from bowls; painting is not typical of Great Salt Lake Gray, but their unusual temper combination (crushed quartz with small amounts of feldspar, calcite, and organics) does appear with a southern Fremont type, Snake Valley Black-on-gray (R. Madsen 1977; Watkins 2009). Each of these decorative styles is represented in collections from the Bear River #3 site (Shields and Dalley 1978) and at the late component of the Levee site (Fry and Dalley 1979). No sherds recovered from any part of the site showed the characteristic basal flattening and angulation of the flower-pot shapes typical of Late Prehistoric Intermountain Ware, nor were any sherds suggestive of conical vessel bottoms.

As best as can be judged within these limited excavations, the Component B1 ceramics represent the earliest ceramic utilization at Chournos Springs at the level of a single household, while the overlying fill comprises the midden deposits from the larger site as a whole, which are of more variable age. The diversity of temper types alone would suggest that not all residents at the site made pottery the same way, which may be attributable to a contemporaneous, household-level differences in ceramic production and utilization, depending on the identity of the ceramics' makers within each household and individuals' access to trade goods, and on time-transgressive processes. Only through expanded excavation and the identification of additional structures will the degree to which this variability represents household-level differences be resolved. Only the question of chronological shifts in ceramic utilization can be examined at present.

Barring a scenario where people dumped household debris on the roofs of their own and neighbours' pit houses while they were still occupied, the ceramics within the B2 fill almost certainly postdate the B1 materials, with the location of the structure being used as a midden after it was burned and abandoned. Differences between Components B and C should accurately reflect changes in community-wide ceramic utilization over time. Differences are slight between Components B2 and C1; an increase in mixed calcite temper and an equivalent decrease in mica-tempered sherds are the main changes. In the uppermost portion of the fill (Component C2), the sand and mica-tempered variants are vanishingly scarce and crushed quartz temper is absent entirely, while calcite-tempered sherds remain abundant; this would appear to be the product of a gradual process. The strong negative association between calcite-tempered ceramics and the pit house floor, Component B1, is conspicuous. The Bayesian-modeled terminal boundary date range for the structure serves as an effective boundary for the initial appearance of calcite-tempered ceramics this site.

Chipped Stone

A total of 174 chipped stone tools, cores, and tool fragments and 3,636 pieces of debitage were recovered at Chournos Springs. The following sections on raw material, debitage, and tools are intended to provide an overview of this portion of the assemblage, with emphasis on diagnostic tools and significant patterns of change in each of the main components. Formal tool descriptions and metrics including tool measurements, weights, and debitage classes are included with the artifact catalogue.

Raw material

During cataloguing of the lithic assemblage, all tools and debitage were categorized into primary and secondary raw material types. The frequency of the primary raw material categories—chalcedony, chert, obsidian, quartzite, siltstone, etc.—are shown in Table 5.6. Obsidian is by far the most common material, making up 71.5% of the debitage (n = 2,600) and 67.2% of the stone tools, cores, and other chipped stone objects (n = 117), while various quartzites, cherts, and chalcedonies were also common. Other raw materials from which isolated debitage specimens were found include mudstone (n = 3), porcellanite (n = 4), sandstone (n = 1), silicified sandstone (n = 4), schist (n = 1), and a soft, striated green stone, possibly steatite (n = 1).

Also listed in Table 5.6 s are a few specimens of calcite (n = 5) and mica (n = 1) that were not used in lithic tool production, but both appear to be the same material used as tempers in ceramic production. In the case of the calcite, it is probably not a coincidence that the raw material specimens were only found in the uppermost fill, where calcite-tempered pottery was most common. Similar calcite tablets have previously been observed at the Orbit Inn site, again in association with calcite-tempered pottery (Simms and Heath 1990). Three of the calcite specimens exhibit marginal crushing and grinding, while two specimens are unmodified. The mica flake is too small (<0.1 g) to determine whether it was in any way modified. Two quartz flakes listed here may also have been processed for use as a tempering agent in pottery rather than as chipped stone tools.

These categories are not ironclad. For instance, chert and chalcedony tend to be loosely applied terms for semi-transparent to nearly opaque, microcrystalline forms of silica. Chalcedony has a fibrous, non-granular character that, with fibre lengths of between 50 and 350 nm, may be difficult to observe with an optical microscope (Heaney 1993; Lee 2007:5–6). Chert here refers to forms of microcrystalline quartz with varying degrees of granularity visible under low magnification (i.e., fine-quartz, 5–20 μm; mesoquartz, 20–50 μm; or macroquartz, >50 μm; cf. Alexandre et al. 2004; Flörke et al. 1982; Hendry and Trewin 1995; Hesse 1989). In more proper petrological terms, cherts form as diagenetic precipitates through the dissolution of amorphous silica into

Table 5.6: Frequencies of primary chipped stone raw material categories (debitage and tools), Chournos Springs.

Material Type	Main Excavation Area					Depression 1			Test Pit 1			Test Pit 2			Test Pit 3					
	A (>24 cm b.s.)	B1 (˜21–24 cm b.s.)	B2 (˜12–21 cm b.s.)	C1 (˜5–12 cm b.s.)	C2 (˜0–5 cm b.s.)	Lower (>25 cm b.s.)	Middle (5–25 cm b.s.)	Upper (0–5 cm b.s.)	Lower (>25 cm b.s.)	Middle (5–25 cm. b.s.)	Upper (0–5 cm b.s.)	Lower (>25 cm b.s.)	Middle (5–25 cm b.s.)	Upper (0–5 cm b.s.)	Upper (0–5 cm b.s.)	Middle (5–25 cm b.s.)	Lower (>25 cm b.s.)	Walls/Spoil	Surface	**Totals**
Calcite				1			3	1												5
Chalcedony	24	10	23	37	36	28	27	18	8	9	1	2	9	4		1		3	7	243
Chert	12	4	42	70	49	7	19	35	23	10	2	14	16	5		9	3	4	23	347
Dacite (?)	1		2	2													1		1	7
Limestone				2	1			1				1								5
Mica						1														1
Obsidian	158	86	410	535	341	197	182	197	63	81	24	60	119	39	5	28	14	47	131	2717
Quartz				1	1															2
Quartzite	30	31	77	65	49	24	43	56	11	3		5	22		2			3	16	439
Siltstone	2		6	3	1	1	2	3	2											22
Slate			3	4	2															9
Other			1	2	5	1	2	1									1		2	15
Totals	**227**	**131**	**564**	**722**	**485**	**259**	**278**	**312**	**102**	**103**	**27**	**82**	**166**	**49**	**7**	**40**	**19**	**57**	**180**	**3810**

microcrystalline forms of quartz *including* chalcedony (Lee 2007:1; Siever 1962; Stamatakis et al. 1991), suggesting that these two materials can co-occur and grade into one another.

Potential for confusion also arises with the distinction between coarse-grained cherts and quartzites (or orthoquartzites). The latter form through the metamorphic diagenesis of sandstone, where the pores between pure quartz sandstone are cemented with microcrystalline quartz (i.e., chalcedony, etc.), causing fractures to pass through rather than around the cemented quartz sand grains (Ireland 1974:264). The difference between diagenetically cemented quartz sand grains and precipitated quartz microcrystals is not one that is likely discernible to most archaeological practitioners.

For practical purposes, the classifications applied here refer to whether individual grains are visible with the naked eye and appear welded in a surrounding microcrystalline matrix (i.e., quartzite), are visible under magnification (i.e., chert), or are not visible under magnification (i.e., chalcedony). Silicified non-quartz sands (i.e., silicified sandstone), finer-grained silts (i.e., silicified siltstone), and clays (i.e., silicified mudstone or claystone) are meanwhile differentiated from cherts here by their complete opacity due to finer grain size and non-quartz composition.

At a glance, only limited variability appears to exist in raw material usage between the different components of the main excavation area. In each component, obsidian is the most common raw material, but while quartzite—available locally in cobble form and from at least one bedrock outcrop near the site—is usually the second most common material, chert is the second most common raw material type in Component C1, making up 9.7% of the material by count. Proportionally, chert is even more common in the uppermost Component C2 (10.1%). At the other extreme, chert is scarce on the structure floor (3.1%) and in the underlying Archaic deposits

(5.7%). These slight variations hint at changing preferences and social access to raw materials, either through direct procurement or trade, over time.

The broad primary raw material categories provide only a vague assessment of the true variability present within the assemblage. In many parts of North America, archaeologists have given colloquial names to macroscopically distinctive siliceous toolstone variants that are sourced to specific quarries or collection areas (i.e., Knife River flint, Edwards chert, etc.). Such designations are uncommon in the literature of the Great Salt Lake area for materials other than obsidian, for which geochemical methods allow specific sources to be identified. That is not to say that distinctive raw materials are not present, but it becomes difficult to compare their use across sites when only limited conventional terminology to describe them is in place.

In this analysis, specimens were assigned to letter-coded subtypes whenever distinct variants of the primary lithic categories were observed under macroscopic and microscopic examination. Twenty-three variants of chert, eight obsidian, six chalcedony, three quartzite, and three siltstone types were thus recorded; their distribution in the cultural components of the main excavation area is shown in Table 5.7. It must be stressed that these categories are provisional and are not intended to serve as a replacement for more authoritative geochemical characterization, but rather to draw attention to the scope of variability present that awaits more comprehensive analysis. Future analysis may reduce the maximal distinctions employed here, for instance as the macroscopic effects of heat-treatment on these variants become better known, or if the variability inherent to single lithic sources could be better defined. Pending further study, the categories described below are intended to offer an expedient, if rudimentary, means of assessing changing raw material access and preferences over time.

Table 5.7: Frequencies of lithic sub-types (debitage and tools), sorted by component, in main excavation area

Material Sub-type	Component A	B1	B2	C1	C2	Description
Chalcedony						
a	2	2	6	11	4	Medium to dark brown (like Knife River Flint); some dark flecks in thin section; tan, crystalline vugs
b	9	6	13	21	24	Milky-white, grey, or tan (pink when heated?); opaque, creamy white patina
c			1		1	Light greyish-brown; woody, randomly oriented reddish-brown flecks
d	13	2	3	4	5	Light grey to grey-brown; layered, opaque internal flowery splotches—white, tan, or rarely pink; macroquartz inclusions; pebbly surface with vugs; milky white sections with crazed fractures (may be same as *b*)
e				1	2	Banded white and tan agate; rarely red spots, faint grey healed fractures
f						Light bluish grey to greyish brown; crazed healed fractures and mossy brown or bright red inclusions throughout; no patination on cortex. (Not found in main excavation area.)
Chert						
a	2	1	15	17	13	Mottled gray, reddish gray, or light to dark red; waxy; grains visible under low magnification
b	1		6	6	3	Pink with reddish brown flecks; waxy lustre; grains visible under low magnification (might be transitional to *c*)
c	3		4	9	10	Mottled yellow, pink, red, and/or white grains; occasional tiny reddish-brown flecks; waxy to highly lustrous; grains visible macroscopically
d			2	7	1	White and/or light brownish gray; highly lustrous to vitreous; grains visible under low magnification; only white sections are translucent; brecciated segments; possibly welded tuff; similar to *y*
e	1		1	3	5	Very dark brown or reddish brown to black; low lustre; opaque; grains appear fused under low magnification
f				1	2	Greyish brown; low lustre; coarsely granular under low magnification; some banding (might be transitional to *i*)
g	1		3	1		Black with white patches; coarser-grained sections white and yellowish brown; low lustre; grains appear fused and sugary under low magnification except in white patches; infrequent healed fractures infilled with white or yellowish brown; probably same as *i* and maybe *s*
h	1			2	3	Reddish brown; opaque; waxy lustre; grains visible under low magnification (might be same as *e*)
i	2		4	1	1	Dark to very dark grey or greyish brown; waxy lustre; coarse-grained under low magnification; some crazed, healed fractures; white crystalline patches
j				4	2	Uniformly white; highly lustrous, but sections patinated to matte white; fracture planes sometimes uneven; grains not visible under magnification; occasional vugs; similar to chalcedony *d*
k		1				Mottled pinkish grey to dark reddish grey; waxy lustre; small chalcedony-filled vugs; fine grains visible with low magnification.

Table 5.7, cont'd.

Material Sub-type	A	B1	B2	C1	C2	Description
	Component					
l				3		Black; faintly translucent along extreme margins; waxy lustre; extremely fine grains visible under high magnification; porphyritic with numerous rectangular white phenocrysts
m					3	Greenish to dark greenish grey or greyish brown; waxy lustre; very fine grains visible under high magnification; dark grey healed fractures sometimes present; scaly facets reminiscent of argillite
n	1	1		5	1	Very dark brown to black; white silica-filled veins; waxy lustre, slightly transparent; very fine grains visible under high magnification
o			1	1		Very dusky red; red-black healed fractures; waxy lustre; grains appear fused under low magnification; grapefruit-rind texture, grainy in thin section
p				1	1	Translucent light grey with numerous circular white patches and chalcedony vugs; grains distinctunder magnification; very low lustre
q				1	1	Mottled greyish brown; marginally translucent; very fine-grained under magnification; infrequent small, empty vugs
r			1	1	2	Reddish black matrix around brecciated dark red fragments; extremely fine-grained; red sections are translucent
s				1		Light grey to dark bluish grey; highly lustrous; fine grains visible under magnification; crazed and sometimes dark healed fractures or brecciated sections; numerous hematite grain inclusions staining surrounding silica reddish brown
t		1	1	1	1	Dark grey with red veins or healed fractures; waxy lustre; grains visible under low magnification
u						Dark greyish brown with black speckling; very translucent; coarse-grained under low magnification, transitional to quartzite (not found in main excavation area)
v						Pink and red brecciated fragments surrounded by clear and white chalcedony matrix; waxy lustre; fine grains visible under magnification, particularly in pink areas (not found in main area)
w			2	4		Mottled bluish light grey; large quartz inclusions; very fine-grained; waxy lustre
x			1			Yellowish brown with occasional dark reddish brown oxidized flecks, except in opaque cortical areas; similar to Madison formation (Montana) chert
y			1	1		Mottled white and dark greyish brown; low lustre; sugary, crystalline texture with numerous crazed fractures and large white crystalline vugs
Obsidian						
a	141	73	364	461	300	Clear through grey-black; highly lustrous; transparent or semi-transparent, occasionally with black striations. 15/15 Malad.

Table 5.7, cont'd.

Material Sub-type	Component A	B1	B2	C1	C2	Description
b	12	13	46	71	40	Opaque black; highly lustrous; rarely, grey sections where black shards are brecciated in lighter matrix. 1/5 Brown's Bench, 3/5 Malad & 1/5 Walcott Tuff.
c						Grey-black; waxy lustre; translucent at margins; highly vesicular under low magnification (not present in main area). 1/1 Malad.
d	3			3		Light grey; highly lustrous; transparent; vesicles macroscopically visible; infrequent black inclusions. 2/3 Unknown A & 1/3 Brown's Bench (Coal Bank Spring).
e					1	Mottled dark greyish brown; highly lustrous; white patination; very slightly vesicular under high magnification (not present in main area). 1/1 Brown's Bench.
f	1					Mottled or banded dark reddish brown and black (mahogany); glassy; transparent or semi-transparent. ½ Brown's Bench & ½ Malad.
g	1					Mottled grey-black; highly lustrous; opaque with marginal translucency; oolitic and crazed, striated white patination
h						Dark reddish brown with tiny black, spherical inclusions; vitreous and opaque (not present in main area). 1/1 Brown's Bench.
Quartzite						
a	30	26	75	65	48	Various colours (white through grey-brown and red); medium- to coarse-grained; grains often protrude above surface of flake scars
b			2			Oolitic yellow grains set in transparent matrix; very fine-grained; highly lustrous; grains cleaved by fracture plane
c		5			1	Grey; transparent in thin section; low lustre; sandy sections and inclusions of red polyhedral crystals (rare); rounded grains similar to temper in ceramics from Component B1
Siltstone						
a			3	1		Dark reddish grey to black; grains visible under magnification including occasional sparkly inclusions; opaque and non-lustrous
b	2		2	1	1	Grey; grains visible under magnification; non-lustrous and opaque
c			1	1		Brown; coarse-grained with occasional flecks of mica; moderate lustre
No. of Sub-types	**18**	**11**	**24**	**31**	**27**	
+ Other Types	**19**	**11**	**27**	**37**	**32**	

When the total number of distinct lithic sub-types is taken into consideration, an interesting trend emerges in the data for the main excavation area. While a relatively limited number of varieties were utilized during the Archaic period (n = 19), even fewer are associated with the occupation of the pit house floor (n = 11). This number increases drastically in the overlying midden deposits, reaching a peak in the Late Prehistoric deposits of Component C1 (n = 37) and dipping only slightly in the thin uppermost fill (n = 32). With the significant caveats that differences between variants may be exaggerated in the optically sorted categories defined here, and that multiple variants may represent the same source material (but see discussion of obsidian below for examples of the opposite), this trend mirrors a pattern seen in the ceramic assemblage: the inhabitants of the pit house, who made but a single variety of ceramics and appear to have either not known of or not had access to other types, also appear to have had very limited access to lithic raw material sources. In the upper fill, a considerably expanded range of lithic raw material types indicates that people participated in broader social networks, had a broader territorial range, or both. This may reflect changes in relative mobility, with reduced variety of ceramic and lithic types in Component B1 reflecting a sedentary lifeway and a significant cultural shift in the Late Prehistoric, but the possibility that some household variability in participation in long-distance trade and out-group contacts took place remains to be tested. That the latter interpretation might be correct is hinted at by the occurrence of isolated examples of exotic Fremont ceramic types like Sevier Gray and Snake Valley Black-on-Gray pottery in the intermediate fill and from elsewhere in the site area, but the trend towards increasing lithic variability remains pronounced even between the B2 and uppermost Component C deposits.

The inclusion of optically sorted subtypes of obsidian in Table 5.7 may be contentious, as obsidian from different sources can be macroscopically identical (Hughes 1998). Several obsidian variants were noted, however, of highly unusual appearance, such as the light gray, vesicular obsidian type *d* seen in small quantities throughout the site area, that could be easily distinguished from the more ubiquitous semi-transparent or opaque black types *a* and *b*. To assess the validity of the lithic sub-types identified here, and to more reliably characterize the assemblage, a stratified

Table 5.8: Geochemically verified sources of individual Chournos Springs obsidian samples (XRF analysis by Richard Hughes [2014]).

Optical Type	Source	Specimen No.	Provenience	Comments
a	Malad	9.1	Component C2	Flake, >12.5 mm
a	Malad	109.1	Depression 1, Lower	Flake, >25.0 mm
a	Malad	184.1	Component A	Flake, >12.5 mm
a	Malad	200.1	Component A	Flake, >12.5 mm
a	Malad	232.1	Depression 1, Middle	Flake, >12.5 mm
a	Malad	284.1	Depression 1, Lower	Flake, >12.5 mm
a	Malad	292.109	Surface	Flake, >12.5 mm
a	Malad	328.1	Depression 1, Middle	Flake, >25.0 mm
a	Malad	332.1	Component B1	Flake, >12.5 mm
a	Malad	336.1	Component A	Flake, >12.5 mm
a	Malad	421.1	Test Pit 2, Lower	Flake, >12,5 mm
a	Malad	451.1	Depression 1, Lower	Flake, >12.5 mm
a	Malad	474.1	Test Pit 3, Middle	Flake, <12.5 mm
a	Malad	491.1	Component C1	Flake, >12.5 mm
a	Malad	551.1	Component B1	Flake, >12.5 mm
b	Malad	134.2	Depression 1, Middle	Flake, >12.5 mm
b	Brown's Bench	190.1	Component A	Flake, >12.5 mm
b	Walcott Tuff	499.2	Test Pit 3, Lower	Flake, >12.5 mm
b	Malad	511.2	Component B2	Flake, >12.5 mm
b	Malad	561.2	Component B2	Flake, >12.5 mm
c	Malad	380.3	Test Pit 2, Middle	Flake, >12.5 mm
d	Unknown A	272.2	Depression 1, Middle	Flake, >12.5 mm
d	Unknown A	327.3	Depression 1, Middle	Flake, >12.5 mm
d	Brown's Bench – Coal Bank Spring	330.3	Depression 1, Lower	Flake, >12.5 mm
e	Brown's Bench	293.25	Surface	Biface fragment, 17.0 mm
f	Brown's Bench	211.3	Component A	Flake, <12.5 mm
f	Malad	1053.2 (605.2)*	Depression 1, Middle	Edgeworn flake, 20.6 mm
h	Brown's Bench	1025.1 (612.2)*	Test Pit 1, Upper	Biface fragment, 14.2 mm

** The samples reported by Hughes (2014) were subsequently renumbered due to duplicate catalogue entries*

sample of seven of the eight distinct obsidian variants (summarized in Table 5.8), along with a random sample of 21 specimens selected from the obsidian assemblage as a whole, were submitted to Richard Hughes at Geochemical Research Laboratory, Palo Alto, for x-ray fluorescence (XRF) and comparison of spectroscopic signatures to known obsidian sources. In order to ensure obsidian fragments have sufficient surface area for XRF analysis, Geochemical Research Laboratory recommends samples be at least 9–10 mm diameter and ca. 1.5–2 mm thick. The only specimen of obsidian type *g* was too small to submit.

Obsidian from five distinct source areas was identified. Two types, including the most common type *a* (15 specimens) and the rare type *c* (1 specimen), exclusively returned values typical for Malad obsidian, from a source area between the Curlew National Grassland and Malad City, ID, some 112 km (70 miles) almost directly north of Chournos Springs. Types *e* (1 specimen) and *h* (1 specimen) returned values exclusively for Brown's Bench obsidian, a type with numerous outcrops in the vicinity of the Idaho-Utah-Nevada border, approximately 210–240 km (130–150 miles) distant. Type *d* was also from the Brown's Bench source area, but from two distinct localities: one flake from Coal Bank Spring, and two from an as-yet unidentified outcrop that Hughes (2014) has termed Unknown A. Two optically sorted obsidian varieties—the perfectly opaque black type *b* and a banded brown-and-black "mahogany" obsidian, type *f*, cannot reliably be attributed to a single source. Of the five specimens of type *b* that were analyzed, three were Malad ash-flow tuff, one was Brown's Bench, and one was Walcott Tuff. The last is known from two outcrops, one at American Falls on the Snake River, 200 km (124 miles) away, and the other near Deep Creek in Clark County, Idaho, near the northeastern edge of the Snake River Plain, 340 km (212 miles) distant. The two specimens of obsidian type *f* were from the Malad and Brown's Bench source areas. Of the samples submitted, then, seven were from various Brown's Bench sources (including Coal Banks Spring and Unknown A), one was Walcott Tuff, and the remainder (n =

17) were Malad. With the exceptions of types *b* and *f*, the optical types at this locale did conform to specific source areas.

Because the sample selection process was not fully random, with optically unusual specimens being singled out for analysis and only large flakes being selected (thus filtering out the most exotic materials subject to the greatest distance decay), the results of the geochemical analysis alone do not serve as an accurate statistical representation of obsidian use at the site. For instance, type *a* makes up 88.2% of the total obsidian assemblage (n = 2,396), but only 53.6% of the submitted sample. Noting that 100% of the type *a* obsidian submitted for XRF analysis is Malad, it is probably reasonable to extrapolate that at least 88% of the obsidian at Chournos Springs is from that source. Other conclusions, however, may be premature. It cannot safely be stated, for instance, that one fifth of all the opaque black ash-flow tuff (obsidian type *b*) from the site is Walcott Tuff or that two thirds are Brown's Bench, as there appears to be some temporal patterning to the non-Malad samples. Within the main excavation area, the only non-Malad samples came from the Archaic Component A (Brown's Bench, n = 2). Two of the remaining Brown's Bench specimens (Unknown A and Coal Bank Spring) were recovered from lower levels of Depression 1, below the depth of the observed erosional contact in what are presumed to be intact Archaic deposits. The single Walcott Tuff specimen was from the deepest cultural deposits (25–35 cm b.s.) in Test Pit 3, again possibly of Archaic origin. One Brown's Bench specimen was found in the disturbed upper level (0–5 cm b.s.) of Depression 1, one (Unknown A) was found at intermediate depth there (19–25 cm b.s.), and the last Brown's Bench specimen was found on the surface of the general site area, but none of these contexts is a reliable indication of late lithic use. Thus, while it is difficult to frame in statistical terms with the available data, there does appear to be a trend of shifting obsidian use from Brown's Bench and other sources to increasing reliance on the Malad source over time: all of the geochemically tested obsidian samples from Component B1 or later come from the Malad source area. Additional testing is recommended to evaluate these patterns before making a more comprehensive statistical assessment.

It is meanwhile significant that none of the tested obsidian from any context at Chournos Springs came from southern sources: all obsidian has been sourced to localities north or northwest of Promontory Point. This stands in contrast to patterns seen in the 13th century and later in Utah Valley, although an increased reliance on Malad there is noted (Janetski 1994, 2002).

Debitage

The 3,636 pieces of debitage recovered on the site surface and from discrete excavation contexts (units, features, and levels) were sorted into raw material types, with each batch of similar raw material assigned a unique catalogue entry. Each such batch was counted and weighed collectively; the number of pieces in each batch exhibiting cortex on the dorsal surface and the number of pieces falling in large, intermediate, and small size classes (>25.0 mm, 12.5–25.0 mm, and <12.5 mm, respectively) was recorded as a simple approximation of the stage of lithic production from which the debitage was produced. In the Chournos Springs assemblage, cortex was generally observed only on the largest lithic pieces.

In primary reduction, large pieces of unusable cortex and lower quality material are knocked off the exterior of large, weathered cores and nodules in preparation for more detailed work. Because cortical material is of little utility to toolmakers and not worth transporting, its presence can indicate whether a material was locally available. The intermediate and small size classes meanwhile represent progressively later stages of lithic production, including reduction of tool blanks, edge shaping through fine pressure flaking, and maintenance through retouch and occasional reshaping. Most lithic debitage at Chournos Springs is small (<12.5 mm, n = 3069, 84.4%), with an average flake weight of 0.93 g. The paucity of even intermediate-sized flakes suggests most lithic material at Chournos Springs was not locally sourced.

The size-classed distribution of the principal raw material types at Chournos Springs is shown in Table 5.9. Included in this list are the two most common chert types, *a* and *c*, obsidian types *a* and *b*, and quartzite type *a*; these are the only sub-types to feature any appreciable number of large (>25.0 mm) or cortical flakes. In general, large flakes make up less than 5% of any given category. Quartzite is the only material type to have been extensively used at the site that features appreciable proportions of large (25.8%) and cortical flakes (15.3%), both indicative of primary reduction. All but one of the large quartzite flakes, and all of the cortical ones, are of type *a*. This type is presumed to be the derived from the many quartzite cobbles found near at hand to

Table 5.9: Debitage size classes and cortical flake frequency for principal raw material types.

Material Type	Size Class <12.5 mm	12.5–25.0 mm	>25.0 mm	Total	# Cortical	% lg.	% cort.
Chalcedony	197	31	2	230	4	0.9	1.7
Chert	225	82	14	321	18	4.4	5.6
a	*47*	*23*	*8*	*78*	*5*	*10.3*	*6.4*
c	*31*	*22*	*2*	*55*	*3*	*3.6*	*5.5*
Dacite (?)	4	3	0	7	2	0.0	28.6
Limestone	0	3	2	5	1	40.0	20.0
Obsidian	2418	173	9	2600	51	0.3	2.0
a	*2137*	*152*	*9*	*2298*	*38*	*0.4*	*1.7*
b	*257*	*17*	*0*	*274*	*12*	*0.0*	*4.4*
Quartzite	204	116	111	431	66	25.8	15.3
a	*195*	*112*	*110*		*66*	*26.4*	*15.8*
Siltstone	12	4	3	19	2	15.8	10.5
Slate	0	3	2	5	1	40.0	20.0
Other	9	6	3	18	4	16.7	22.2
Grand Total	3069	421	146	3636	149	4.0	4.1

Chournos Springs, in the alluvial plain and on the slopes of the mountain spur to the south.

The proportions for this quartzite variant set a baseline for evaluating which materials were locally available and which were procured from more distant sources. Slate, siltstone, and limestone probably fall in the local material category, but based on absolute frequency, they appear to have been little preferred. In contrast, very few large or cortical flakes were found of any obsidian variety; cortex is not expected to be a feature of obsidian sourced from exposed outcrops, but Malad obsidian does occur in the form of rounded cobbles with weathered cortex.[22] Despite the long distances involved in its procurement, the very high quantities of obsidian debitage show that this was a highly favoured material. It arrived at the site in a prepared form, either as flake blanks or cores. Low frequencies of large and cortical flakes from chalcedony and chert show that these, too, were non-local materials, but higher than average frequencies for chert type *a* suggest its source may be nearer than other variants.

Referring once again to the frequencies of raw material types amongst the cultural components in the main excavation area (Tables 5.6 and 5.7), the reliance of the pit house occupants on quartzite, and especially quartzite type *a*, is striking. So, too, is their reliance on Malad obsidian at the expense of other sources, and the almost complete absence of chert type *a*, despite its inferred proximity to Chournos Springs. Conversely, the exceptional geographic range of the Late Prehistoric occupants of the site is supported not just by the variety of lithic varieties they used, but by the suggestion that these materials are, for the most part, non-local.

Table 5.10: Chipped stone cores and tools, Chournos Springs.

	Main Excavation Area					Depr. 1			Test 1			Test 2			Test 3					
Tool type	A	B1	B2	C1	C2	Lower	Middle	Upper	Lower	Middle	Upper	Lower	Middle	Upper	Lower	Middle	Upper	Wall/Spoil	Surface	Total
Bifaces			1	1			1					1							2	6
Biface & point fragments	5	3	5	7	2	4	6	1	1	4	1	1	1		1	1	1	2	12	58
Blade-like flake																			1	1
Choppers					1					1									1	3
Cores	1				1		1						1						1	5
Drill			1																	1
Edgeworn flakes			2	5			4	1	2	1	1	1				1		1	12	31
Projectile points																				
Bear River Side-Notched				1									1							2
Cottonwood Triangular		2								1									1	4
Desert Side-Notched		1		3	1								1						3	9
Elko	2					1	1													4
Elko (reworked as scraper)		1																		1
Rose Spring Corner-Notched				2							1								1	4
Rose Spring/Uinta Side-Notched					1			1											2	4
Retouched flakes	1			4	2			1		2		2	1		1			1	9	24
Scrapers					2		1	1						1					5	10
Unifaces				1										1					1	3
Wedge							1													1
Worked lithic (calcite tablet)				1			1	1												3
Total	9	7	9	25	10	5	16	6	3	9	3	5	5	2	2	2	1	4	51	174

Cores and tools

The 174 chipped stone artifacts from Chournos Springs that show some evidence of deliberate modification or use are listed in Table 5.10.

Four exhausted cores were recovered, together with one core fragment. The complete cores were generally small, ranging in maximum length from 32.5 to 40.9 mm and weighing from 6.4–30.6 g. Two, together with the core fragment, are from obsidian type *a* (most likely Malad), one is from chert type *h*, and one is from siltstone. All exhibit multidirectional flake removals, but all three obsidian core specimens also exhibit flake removals from opposing ends of a longitudinal axis with some platform crushing consistent with bipolar flake production.

Though no quartzite cores were found—unexpected, given the evidence at the site for primary reduction from quartzite cobbles—three large quartzite choppers were. The choppers were fashioned from transversely split quartzite cobbles: through the removal of large, unidirectionally oriented flakes from one side of the transverse fracture plane, an expedient working edge was fashioned that on each specimen is heavily crushed and battered, evidencing extensive use. These tools may have been used in splitting and pulverizing animal bone in preparation for grease rendering.

A range of other activities are indicated by the diverse array of other tools at the site, with most chipped stone implements being either expedient (i.e., retouched flakes, n = 24) or fragmentary. A total of 31 edgeworn flakes were also recorded, exhibiting wear under microscopic examination that could include damage from expedient use or taphonomic processes such as trampling. Hideworking implements are not common (n = 10), most of them found within the uppermost Component B2 and equivalent depths or on the surface. Items classified here as bifaces and projectile points are, for the most part, partial specimens, variously missing either tips, shoulders, or portions of bases. A large number of biface fragments include pieces of both general-purpose knives and smaller fragments of what were likely projectile points, but lacking elements attributable to any particular style, as well as a possible projectile point preform of indeterminate style.

The sequence of projectile points at Chournos Springs, sorted by component and level, is shown in Table 5.11. In some respects, these fall in their expected chronological order (following Holmer and Weder 1980 and Justice 2002) within the various components of the main excavation

Table 5.11: Projectile point distribution, sorted by latest commonly attributed date range (dates following Holmer and Weder 1980 and Justice 2002).

Point style	**Date range (BP)**	**A**	**B1**	**B2**	**C1**	**C2**
Main excavation area only						
Elko	3,500+ to 1,400	2	1 (reworked)			
Uinta/Rose Spring Side-Notched*	1,200–750/ 1,500–650					1
Rose Spring Corner-Notched	1,500–650				2	
Bear River Side-Notched	1,250–650				1	
Cottonwood Triangular	900–200		2			
Desert Side-Notched	800–200		1		3	1
With other excavated level and surface finds		A/ Lower	B/ Middle	C/ Upper/ Surface		
Elko	3,500+ to 1,400	3	1 (+ 1 reworked)			
Uinta/Rose Spring Side-Notched*	1,200–750/ 1,500–650			4		
Rose Spring Corner-Notched	1,500–650			4		
Bear River Side-Notched	1,250–650		1	1		
Cottonwood Triangular	900–200		3	1		
Desert Side-Notched	800–200		2	7		

** Rose Spring Side-Notched and Uinta Side-Notched have closely matching type descriptions (Fry and Dalley 1979:36-37; Holmer and Weder 1981:60), but there is a notable disparity in the attributed date ranges for the two types.*

area, and by depth in the other excavated units. However, they also show many of the simultaneous overlaps that make any attribution of a cultural seriation based on diagnostic point styles problematic in the eastern Great Basin. Included in Table 5.11 are the results for the main excavation area, where stratigraphic control is greatest, and a condensed seriation including all points from the broader site area which confirms the same general trends seen in the main excavation block.

Most consistent with findings from elsewhere in the Great Salt Lake area, the wide-based Elko type appears associated with the Archaic Component A, except for one find from the pit house floor (Component B1) which had been repurposed as a scraper. Elko series points, much larger than side- and corner-notched Fremont arrow points, have origins in the Archaic period—at least as early as 3,500 BP (Holmer 1986; Justice 2002). These may indicate the transition from atlatl dart and bow-and-arrow technology during the early Fremont era (G.M. Smith et al. 2013), although their being scavenged from Archaic occupations and reuse as hafted knives has also been offered as an explanation for why they sometimes appear in Fremont-affiliated occupations (Reed et al. 2005:271). The converted scraper certainly appears to fit this latter pattern.

Also consistent with the expected projectile point sequence for the area, Cottonwood Triangular points, which begin to appear in the late Formative period ca. 900 BP, were only found in association with the pit house floor (Component B1). Cottonwood Triangular points make up 15% of all projectile points at Fremont-affiliated sites in the eastern Great Basin, although it has been suggested that these could simply be unnotched arrow point preforms misidentified as functional tools (Reed et al. 2005:271-273). The specimens at Chournos Springs are generally broken, with missing tips, shoulders, or other breakage characteristic of use as projectiles.

A single Desert Side-Notched point was also present in association with Component B1, the frequency of this style increasing in the upper midden deposits. Three were found in Component C1 and one in C2, conforming with the widespread association of the point type with late and post-Fremont occupations: first appearing about 800 BP, Desert Side-Notched points eventually became the sole projectile point type used in the northern and western periphery of the Fremont area. Desert Side-Notched points are ubiquitous throughout the Great Basin and adjacent regions from the terminal Formative to terminal Protohistoric periods. Several authors have noted their association with Shoshoni ceramics and similarity to side-notched points on the northern Plains (Fowler et al. 1973; Frison 1971; Holmer and Weder 1980:60). While Janetski (1994) has included Desert Side-Notched points as a characteristic attribute of Promontory Phase occupations, Holmer (1986) has suggested they are affiliated with Numic expansion.

It should be noted that the term Desert Side-Notched, as used by Holmer and Weder (1980) and followed here, is inconsistently applied, and these points are frequently misidentified in the northern Great Basin (Joel Janetski, personal communication, 2014). The original definition of Desert Side-Notched by Baumhoff and Byrne (1959) included variants with limited spatial distributions. Holmer and Weder (1980:56) distinguished several other types from the original style range, including Uinta Side-Notched and Bear River Side-Notched, both seen as typically northern Fremont types, and Nawthis Side-Notched, typical of the Fremont in the southern Great Basin. Only the distinctive basally notched Sierra subtype of Baumhoff and Byrne's original typology is referred to as Desert Side-Notched in Holmer and Weder's later work, a distinction that appears to be the source of some confusion. Examples of Desert Side-Notched points published prior to 1980—for instance from the Levee and Knoll sites (Fry and Dalley

1979:37, 72)—would instead be classified as straight-based, high side-notched Bear River Side-Notched projectile points following Holmer and Weder (1980:60). One such Bear River Side-Notched point was found in Component C1 and is typical of late Fremont sites in the Great Salt Lake wetlands, where they are associated with the diverse range of Great Salt Lake Gray ceramics (Reed et al. 2005:271). While they can co-occur with both Desert Side-Notched and Cottonwood Triangular points, they are not commonly seen after about 650 BP.

The Rose Spring Corner-Notched points in the upper fill at Chournos Springs are somewhat problematic. Round-barbed Rose Spring Corner-Notched points are most typically associated with the *earliest* Fremont sites; these are frequently accompanied by square-barbed Eastgate Expanding-Stem points along the northwestern Fremont periphery, which together form a continuum of forms referred to as the Rosegate series by Thomas (1981). At Chournos Springs, Rose Spring Corner-Notched points' appearance in Component C2 seems uncharacteristically late, given that this style is usually regarded as uncommon in the Fremont area after about AD 950 (Reed et al. 2005:271) or possibly AD 800 (Justice 2002). Two additional examples, one from the uppermost level of Test Pit 1 and another from the surface of the general site area, reinforce the impression that this point style was introduced late at Chournos Springs. However, the point form is noted to persist to about 650 BP in the southwestern Great Basin (Garfinkel 2007; Yohe 2000)—temporally late enough to postdate the Component B1/B2 structure and with the same potentially late calibrated age as the Bear River Side-Notched points. It is perhaps noteworthy in this regard that Bettinger (1994) has drawn particular attention to Rose Spring Corner-Notched points as a possible marker of Numic expansion.

A number of poorly made, shallowly side-notched points in the uppermost fill—one from Component C2, another from Depression 1, and two found on the surface during a survey of the general site area—are also difficult to assess. Two point styles fit the general appearance of these specimens: the Rose Spring Side-Notched point type, previously reported in the Great Salt Lake wetlands by Fry and Dalley (1979:36–37) with shallow side-notches, slightly concave bases, unifacial retouch, and "only fair" workmanship, and the Uinta Side-Notched type featuring "low side-notches and irregular outlines" and that "are often crudely made, with little care taken to make them symmetrical" (Holmer and Weder 1981:60). The Uinta designation is today more commonly used in the Great Salt Lake area (Joel Janetski, personal communication 2014), but the date range usually attributed to this points style, ca. 1,200–750 BP (Holmer and Weder 1980), is at odds with their apparent stratigraphic position above the pit house and associated fill. It may be of interest that the description of poorly flaked and asymmetrical points also corresponds with what Thomas Kehoe (1966) termed the Prairie Side-Notched style and Peck and Ives (2001) termed the early Cayley Series on the Northwest Plains. Dates for these and the geographically contiguous Uinta Side-Notched style are generally equivalent. With the difficulties in dating the poorly sorted upper fill at Chournos Springs already being noted, the discrepancies between the Uinta or Rose Spring Side-Notched and Rose Spring Corner-Notched points and their expected position in the stratigraphic sequence cannot easily be resolved here. The frequency with which they occur in the uppermost fill would suggest that this is not simply an accident of post-depositional disturbance.

Despite some lingering uncertainties in the chronological seriation of the late side- and corner-notched points, a similar trend can be observed in the projectile point styles at Chournos Springs that also has been noted in the ceramic assemblage and in lithic raw material variability.

The pit house structure exhibits a small range of stylistic variability—Cottonwood Triangular and Desert Side-Notched, with repurposing of an older Elko point—while a notable expansion of stylistic diversity appears in the upper fill.

Other stone objects

The remainder of the lithic assemblage is summarized in Table 5.12, including a varied assortment of groundstone, incised stones, and other objects.

Groundstone

Numerous groundstone implements are present at Chournos Springs, including eighteen groundstone specimens observed during a systematic site survey and left *in situ*. Pieces found during excavation were taken to the lab for measurement and description. The collected array of nine manos (four of them with only light evidence of grinding and no extensive shaping) and 11 metates (with five showing only light evidence of possible use) thus provide only a partial picture of groundstone frequency and of the intensity of food processing at the site.

Only one mano—a rectangular cobble with flattened dorsal and ventral faces and pecked, rounded margins—and one lightly smoothed, possible metate were found intact. The mano (FS 565.1) was recovered from the structure floor (Component B1), while the metate (FS 810.1) was found resting at the depth of the contemporary exterior ground surface, possibly on an interior ledge of the structure. The remainder of the groundstone assemblage, most of it (n = 14) from the overlying fill above the structure floor or at an equivalent depth, was found in a fragmentary state and appears to have been broken through thermal modification. Although this is a small sample from which to draw conclusions, a pattern of changing groundstone use may be suggested that is

Table 5.12: Other worked stone objects, Chournos Springs

	Main Excavation Area					Depr. 1			Test 1			Test 2			Test 3					
Tool type	A	B1	B2	C1	C2	Lower	Middle	Upper	Lower	Middle	Upper	Lower	Middle	Upper	Lower	Middle	Upper	Wall/Spoil	Surface	Total
Bead												1								1
Groundstone																				
Mano	2	1		1			1													5
cf. Mano			1	2						1										4
Metate				4		1						1								6
cf. Metate	1			2			2													5
Unid. groundstone				2			1													3
Hammerstone						1													1	2
cf. Hammerstone				1	1															2
Incised stone	2		3	8	2		1									1			4	21
Manuport			4																	4
Total	5	1	8	20	3	2	5	0	0	1	0	2	0	0	0	1	0	0	5	53

in line with Grant Smith's (2004:142) observation of extensive recycling of groundstone in stone boiling at Promontory Phase sites in Utah Valley.

Three other groundstone objects were recovered for which only tentative identifications may be provided. FS 436.1 is a rounded sandstone fragment of what appears to be the rim of a flat vessel or disc-shaped object. FS 870.1 is a quartzite pebble with the same characteristic shape and size as many of the incised stones found at Chournos Springs (discussed below), with one wider end and one tapered end. However, it lacks any visible incised lines; the lateral margins of the wider end, however, appear to have been worn through crushing and grinding. It is uncertain whether this is a result of percussion or an attempt to shape the piece. FS 1052.1 is a rectangular flake or spall fragment of greenish stone, possibly steatite, with one smooth, convex, and highly lustrous surface. Under low magnification, tool marks or grinding were not clear, but its convex shape would suggest that it is. The piece may be part of the interior of a groundstone pipe bowl or other vessel.

After cataloguing of the groundstone assemblage was completed at the Museum of Peoples and Cultures at Brigham Young University, Provo, the majority of the assemblage, including most heavier pieces, was discarded; only a sample of more intact and finely formed pieces was retained.

Incised stones

The 22 incised stones from Chournos Springs (Figure 5.22) comprise a significant artifact category, with most of the specimens (n = 16) coming from the main excavation area (this total includes a partial refit of two fragments as a single specimen). These were recovered from each component except the structure floor, inviting speculation into the seeming continuity of an

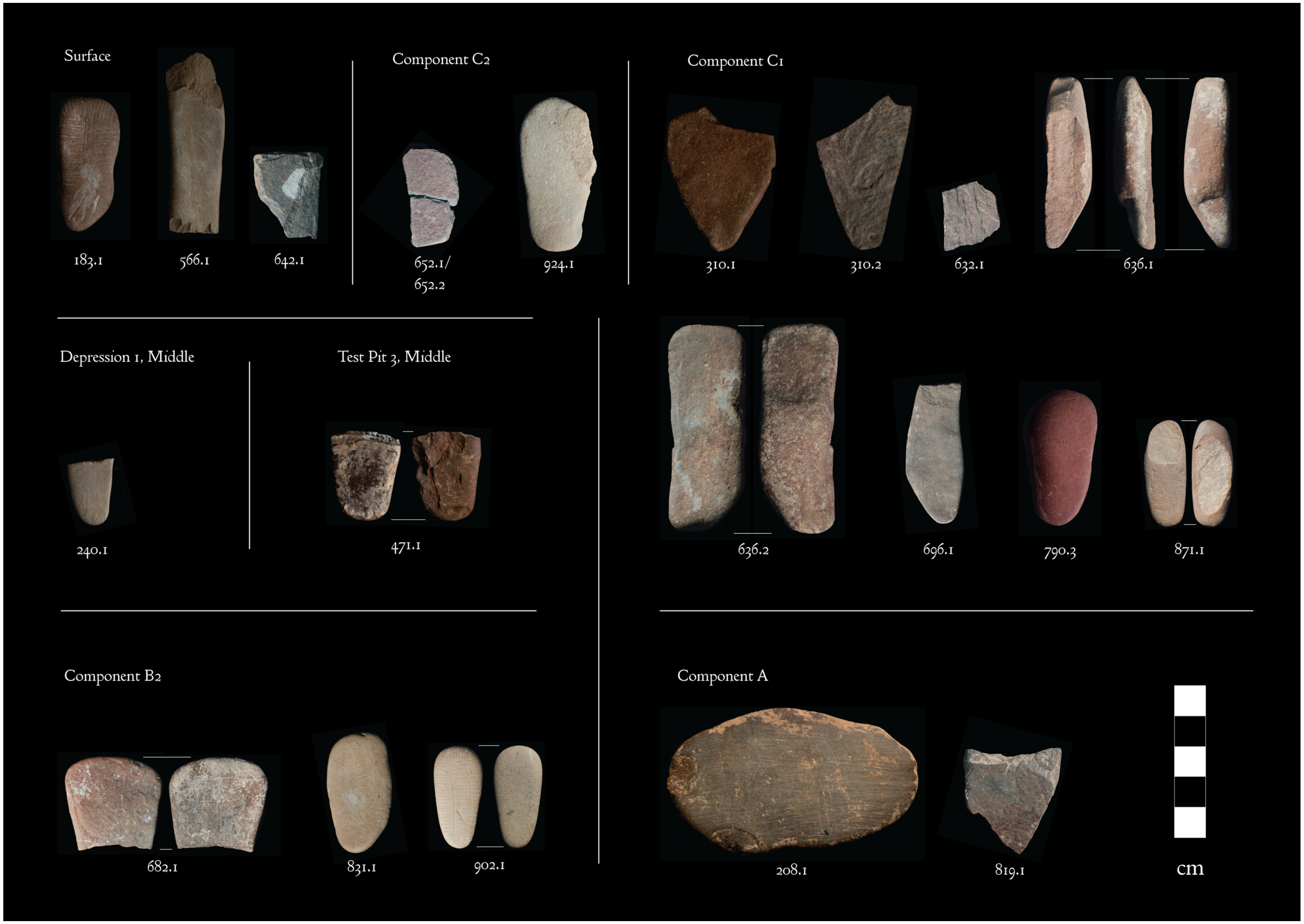

Figure 5.22. Incised stones from Chournos Springs, sorted by component or other excavation level. Not pictured is fragmentary surface find 293.28.

iconographic tradition from the Archaic through Late Prehistoric periods or the widespread communication of shared ideological concepts among different peoples, and quite possibly both.

Perhaps the most distinctive features of the assemblage at a glance are the prevalence of the use of smooth siltstone pebbles (n = 15) and, when oriented longitudinally, for the incised stones to have one distinctly wider end than the other (n = 16). In a few cases, this longitudinal asymmetry is expressed simply as a narrowly tapered end, while the widest point falls somewhere on the middle of the stone (FS 636.1 and 696.1, for example). More commonly, the stones have a distinctly broad-shouldered and narrow-waisted appearance recalling the handle termini of Fremont ceramic figurines and the similar-shaped rock art panel in Cave 1.

The most conspicuous example of a figurine-like shape is FS 682.1, from the Component B2 fill, which has been deliberately ground and formed into a wedge shape. Although the specimen is broken and only the wider portion of the object was recovered, its form is immediately reminiscent of the several Fremont figurine-like, trapezoidal stones that have been recovered from sites in the Willard Bay area (Figure 5.23; David Yoder, personal communication, 2017), except that the Willard Bay specimens are unincised. Other locales with similar unincised,

Figure 5.23. Figurine-like trapezoidal worked stones from sites in the Willard Bay area: Injun Creek (42WB34), Willard (42BO3), and Willard Mounds (42BO4). Figure provided courtesy of David Yoder.

trapezoidal stones are known; three were recovered, for example, at the Roadcut site (42GA4095) in southern Utah (Joel Janetski and David Yoder, personal communication, 2017).

The incised lines on the figurine-like piece and several other of the Chournos Springs specimens appear to delineate a shoulder region, separating an upper third "head" region from a tapering torso and basal terminus. This recurrent pattern, coupled with the highly conspicuous shape of the Willard Bay-area trapezoidal stones, hints at some common ideology underpinning the iconographic representations of the incised stones, trapezoidal stones, and Fremont figurines—a relationship that is more clearly suggested in another figurine found by a collector in the Willard area sometime before 1936 and donated to the Natural History Museum of Utah (David Yoder,

Figure 5.24. Left, carved and incised, trapezoidal stone Fremont figurine collected in the Willard area sometime before 1936. Right, figurine-like incised pebble from the Levee site (42BO107) with well-delineated shoulders, chin, and eyes, tapered shape reminiscent of handle termini, and haphazard incised lines at one end (photos courtesy David Yoder).

personal communication, 2017; Figure 5.24, left). Here, shoulders, head, chin, and eyes are clearly carved, while lighter incisions on the torso area appear to depict clothing or jewelry. Despite lingering uncertainty over its provenience, this object can readily be identified as an incised, trapezoidal stone that closely copies the form of more commonly known ceramic Fremont figurines.

If the Willard-area specimen offers a compelling link between trapezoidal stones and Fremont figurines, yet another specimen, this one from the late and Promontory-contemporary component of the Levee site (Fry and Dalley 1979; Figure 5.24, right), indicates that at least in some cases, similar overlap existed between the iconography of figurines and the more abstract, pebble-like incised stones so ubiquitous at Chournos Springs. The scribble-like, longitudinally aligned incised lines at the base of the Levee site figurine are especially reminiscent of fragmentary specimen 240.1 from Chournos Springs, of which only the tapered, presumably basal terminus was recovered. More generally, the transverse lines delineating the upper quarter or third of some of the tapered incised stones at Chournos Springs (FS nos. 183.1, 682.1, 902.1, 790.3, and 924.1) may roughly outline the separation of head from body area, but in these cases, the identification of such stones as anthropomorphic is tenuous as best.

Indeed, were it not for the few examples of what appears to be blending in stylistic traditions around the east and northeast shores of the Great Salt Lake that allow a connection between the kachina-like properties of ceramic Fremont figurines and incised or unincised stone figurines to be drawn, the specimens from Chournos Springs would seem to fit more comfortably within the range of incised stones known from sites in the mountains and deserts to the west and southwest, and extending from a tradition that originates deep in the Archaic period. Motifs such as isolated or crisscrossed lines on several of the Chournos Springs incised stones cannot be attributed as anthropomorphic, and while a plurality of the stones exhibit figurine-like tapering, not all specimens possess this attribute. Bearing striking similarity to other specimens of the Chournos Springs assemblage are the incised stones from Hogup Cave (Aikens 1970; Ottenhoff 2015): fashioned from rounded and basally tapered pebbles, close analogues of two patterns can be found at both sites. One (Figure 5.25, left) exhibits a starburst-like pattern of parallel lines radiating outward from a central point, as seen on FS 183.1 at Chournos Springs. The other (Figure 5.25, right) bears a somewhat trilobite-like appearance with a transversely sectioned "head" area and close-set rows of parallel lines down either lateral margin extending from a longitudinally demarcated zone, as seen on one face of FS 912.1.

Figure 5.25. Incised stones from Hogup Cave (photos courtesy Randy Ottenhoff).

More generally, incised stones—commonly on rounded pebbles—are a common occurrence in the Central and Southern Great Basin. Mapping the distribution of approximately 3,200 incised stones within Numic territory, David Hurst Thomas (2017) found that they almost exclusively occur in the Great Basin or Wyoming Basin, and only in very rare instances do they occur on the Colorado Plateau. It is principally in the Great Salt Lake and Utah Lake areas that incised stones occur in association with Fremont pottery types. The transfer of motifs from stone and ceramic figurines to incised trapezoidal stones or naturally tapered pebbles, not previously addressed in the literature, appears to be a phenomenon restricted to sites around the north and east ends of the Great Salt Lake from Promontory Point to Willard Bay. The ability of motifs to occur on both incised stones and Fremont figurines, resulting in some blurring of the distinction between the two artifact classes, coupled with the rarity of their co-occurrence in either form within individual assemblages, implies that they occupied a similar niche of iconographic representation and ceremonial or magico-religious function.

The incised stones recovered from Chournos Springs do not bear any great similarity to the incised stones identified by Julian Steward as representative of the Promontory culture (Figure 5.26). In the Promontory Cave and related assemblages, it is the incised motifs themselves that are frequently anthropomorphic, appearing to depict figures with heads, legs, arms, and elaborately

Figure 5.26. Incised stones frm the Promontory Caves featuring elaborately etched anthropomorhic figures (various scales). Specimens at left (Cave 1) and center (Cave 3) photographed by John W. Ives. Specimen at right (Cave 2) photographed by Joel Janetski.

decorated skirts, necklaces, and headdresses. Moreover, the stones from the Promontory Caves are irregularly shaped and are often angular pieces of slate, generally lacking any form resembling handle termini. While it can safely be stated that the Promontory people possessed or had taken up a distinctive incised stone tradition, it took a form different from that seen at Chournos Springs and other Great Basin sites.

<u>Other items</u>

A single stone bead, made from a coarse, vesicular basalt, was found in the lower levels of Test Pit 2. The object is about 5.1 mm across with a chip missing from one portion and has been drilled from both sides to create a recessed central hole, 1.6 mm in diameter.

Four collected objects were identified as hammerstones (n = 2) or possible hammerstones (n = 2) based on the presence of crushed and pecked surfaces. The less certain attributions are for small cobble-sized objects (one quartzite and one chert) with minor flake removals that exhibit battered, rounded arrises. These may instead be failed, discarded cores.

Four unusual items have been classed here as manuports. Two are small stone balls, their entire exterior consisting of smooth, polished reddish-brown cortex. Neither is perfectly spherical, one having an average diameter of 18.9 mm and the other 8.3 mm. Their material type is uncertain. The other two manuports are small, symmetrical, oblong rectangular siltstone pebbles, closely similar to each other in size and shape 38.0–41.0 mm long, 13.1–13.8 mm wide, and 7.4–8.3 mm thick. Their form, dimensions, and material are similar to some of the incised stones at the site, but neither appears to have been modified in any way, aside from a small portion that has spalled off one end of the flattened dorsal face of one of the objects.

Fire cracked rock

FCR is abundant throughout the site area, with a total of 117.72 kg collected in the 2013 and 2014 excavations, for an average of 21.64 kg per cubic meter excavated. This figure understates the total amount of thermally modified rock present at the site: few of the groundstone implements described above were recovered intact, many showing signs of thermal alteration, and could also be considered as FCR. An unmeasured quantity of other rocks encountered during excavation showed no signs of cracking or discoloration from heat and so were not collected, although they could well have been subjected to limited use in hot stone cookery.

Table 5.13: Fire cracked rock, Chournos Springs

Component or Depth Range	Excavated Volume (m^3)	Weight (kg)	Count	Adjusted weight/ volume (kg/m^3)
Main Excavation Area				
C2	0.72	11.83	397	16.52
C1	1.03	22.33	662	21.79
B2	0.67	22.70	586	34.16
B1	0.20	9.96	178	50.05
A	0.34	8.70	141	25.67
Depression 1				
Upper (0–5 cm b.s.)	0.19	2.89	116	21.00
Middle (5–15 cm b.s.)	0.26	8.95	200	34.10
Lower (>25 cm b.s.)	0.45	4.40	57	9.89
Test Pit 1				
Upper (0–5 cm b.s.)	0.05	1.87	27	37.34
Middle (5–25 cm b.s.)	0.20	3.42	99	17.11
Lower (>25 cm b.s.)	0.30	4.51	76	15.04
Test Pit 2				
Upper (0–5 cm b.s.)	0.05	0.04	8	0.81
Middle (5–25 cm b.s.)	0.20	3.64	123	18.20
Lower (>25 cm b.s.)	0.50	4.68	109	9.35
Test Pit 3				
Upper (0–5 cm b.s.)	0.05	1.41	50	28.11
Middle (5–25 cm b.s.)	0.20	3.07	48	15.36
Lower (>25 cm b.s.)	0.10	1.78	32	17.80
Wall/Spoil	-	1.56	40	-
Total	5.44	117.72	2949	**21.64**

FCR is not evenly distributed throughout the site area (Figure 5.13). Based on counts and weights alone, the highest frequencies of FCR were found concentrated in the pit house fill and overlying midden deposits (Components B2, C1, and C2). These also happen to be the most intensively excavated portions of the site, both by area and volume: the hard-packed sediments of the pit house floor (B1) were exposed beneath only a portion of this area and were comparatively thin (generally, only 1–3 cm in depth). Underlying archaic deposits were excavated in an even smaller portion of the main excavation area. When the recovered totals are adjusted for the excavated volumes of each component, the greatest concentration of FCR was in fact recovered from on or within Component B1 (slightly more than 50 kg/m^3, more than double the site average).

Additional data on the FCR assemblage including raw material types, fracture types (to assess whether breakage occurred through dry heat or water immersion, cf. Dau 1988; P. McParland 1977), and size classes (to assess transport costs and reuse of stones, cf. Brink and Dawe 2003) are recorded in the artifact catalogue accompanying the Chournos Springs collection. After cataloguing was completed at the Museum of Peoples and Cultures at Brigham Young University, Provo, the collected FCR was discarded.

The sheer ubiquity of this artifact class at Chournos Springs is in itself an observation of note, standing in stark contrast to Promontory Cave 1, where FCR is absent. While the people at Chournos Springs appear to have routinely cooked their food both by burying hot stones in carefully arranged roasting pits or dropping hot stones into water-filled baskets, ceramic vessels, or hide-lined boiling pits (Driver and Massey 1957; Herzog and Lawlor 2016; Thoms 2008:445–446), alternate measures seem to have been employed by the Promontory people, likely involving direct heating of ceramic vessels over open fires, possibly using grease-rich bones as an accelerant (Johansson 2014; see discussion in Chapter 6).

Faunal remains

Worked bone

Two worked bone artifacts were recovered during the 2013 and 2014 excavations: the tip of a bone awl and half of a bone bead. Both items were recovered from the upper midden deposits overlying the pit house structure, the awl from Component C2 and the bead from Component C1. Species identifications for neither bone tool fragment have been attempted.

The awl fragment (FS 662.2) consists of the highly polished tip of a symmetrically rounded, finely wrought tool, 13.2 mm in length. It exhibits some wear at its pointed distal end. At its proximal end, the fragment is 3.3 mm thick.

The bead fragment (FS 502.1) comprises half of a longitudinally split, highly polished, dark brown tubular bead, 8.4 mm in length. From the intact portion, the outer diameter can be measured at 4.9 mm, with an inner diameter of 3.5 mm. The walls were thus very thin (0.5 and 0.8 mm at opposite ends). Both ends are tapered, polished, and rounded, suggesting the bone was ground and polished after being cut. No cut or snap marks are visible. The interior surface is also smooth and polished, but some ridges of the endosteum are visible.

Unmodified faunal bone

A total of 9,050 faunal bones and bone fragments were recovered in the 2013 and 2014 excavations at Chournos Springs. Table 5.14 summarizes the total number of identifiable

Table 5.14: Unmodified faunal bone specimens, Chournos Springs

	Main Excavation Area					Depr. 1			Test 1			Test 2			Test 3					
Taxa	**A (>24 cm b.s.)**	**B1 (˜21–24 cm b.s.)**	**B2 (˜12–21 cm b.s.)**	**C1 (˜5–12 cm b.s.)**	**C2 (˜0–5 cm b.s.)**	**Lower (>25 cm b.s.)**	**Middle (5–25 cm b.s.)**	**Upper (0–5 cm b.s.)**	**Lower (>25 cm b.s.)**	**Middle (5–25 cm. b.s.)**	**Upper (0–5 cm b.s.)**	**Lower (>25 cm b.s.)**	**Middle (5–25 cm b.s.)**	**Upper (0–5 cm b.s.)**	**Lower (>25 cm b.s.)**	**Middle (5–25 cm b.s.)**	**Upper (0–5 cm b.s.)**	**Wall/Spoil**	**Surface**	**Total**
Family, Genus, & cf. Genus																				NISP
Antilocapra americanus		1										1	2							**4**
cf. *Antilocapra*								2												**2**
Bison bison	1	1	1																	**3**
cf. *Bison*				1				1												**2**
Ovis canadensis		1	2							2			7			2				**14**
cf. *Ovis*			1																	**1**
Odocoileus hemionus		1	9	5	2	3	5					1	2					2		**30**
cf. *Odocoileus*		1	2	3			1													**7**
Canidae			1																	**1**
cf. *Canis* spp.																1				**1**
cf. *Erethizon dorsatum*							3								1					**4**
Leporidae			8	1			1					2	1			1				**14**
cf. Leporidae			1																	**1**
cf. *Sylvilagus* spp.			4	1						1		1								**7**
cf. *Neotoma* spp.				1									1							**2**
cf. *Urocitellus mollis*			1																	**1**
Colubridae			1																	**1**
Falco spp.								1					1							**2**
cf. *Falco*		1																		**1**

Table 5.14, cont'd.

Taxa	Main Excavation Area					Depr. 1			Test 1			Test 2			Test 3					
	A (>24 cm b.s.)	B1 (˜21–24 cm b.s.)	B2 (˜12–21 cm b.s.)	C1 (˜5–12 cm b.s.)	C2 (˜0–5 cm b.s.)	Lower (>25 cm b.s.)	Middle (5–25 cm b.s.)	Upper (0–5 cm b.s.)	Lower (>25 cm b.s.)	Middle (5–25 cm. b.s.)	Upper (0–5 cm b.s.)	Lower (>25 cm b.s.)	Middle (5–25 cm b.s.)	Upper (0–5 cm b.s.)	Lower (>25 cm b.s.)	Middle (5–25 cm b.s.)	Upper (0–5 cm b.s.)	Wall/Spoil	Surface	Total
cf. *Corvus* spp.													1							1
Subtotal NISP	**1**	**6**	**31**	**12**	**2**	**3**	**10**	**4**	**0**	**3**	**0**	**5**	**15**	**0**	**1**	**4**	**0**	**2**	**0**	**99**
<u>Class & Family</u>																				<u>NUSP</u>
Artiodactyla	77	15	285	247	58	18	31	26	14	16	12	50	67	6	1	3		24	2	952
small Artiodactyla	4	24	127	103	23	12	62	37	20	20		17	57		5	30				541
Aves (unid.)	14	20	13	15	7	3	42	28				5				3				150
large Aves	11	1	2												1					15
medium/large Aves	1		1	2			12													16
medium Aves		1	7	1	2								3							14
small Aves		1	12	5									1					1		20
Rodentia	2	1	8	17			3		2	1		3	2							39
Mammal (Unid.)	331	188	1625	1201	360	168	594	403	244	69	3	149	387	27	11	32		272	3	6067
large Mammal	14	8	190	188	62	6	16	23	14	10	3	8				1		16	2	561
medium Mammal	1		119	15	3	2	5	5					1			1		1		153
small Mammal	13	3	189	126	7	11	7	16	18	5		15	17					3		430
Subtotal NUSP	468	262	2577	1918	522	220	769	538	312	121	18	247	534	33	18	70	0	317	7	8951
Grand Total	**469**	**268**	**2608**	**1930**	**524**	**223**	**779**	**542**	**312**	**124**	**18**	**252**	**549**	**33**	**19**	**74**	0	**319**	**7**	**9050**

specimens (NISP = 99) and unidentifiable specimens (NUSP = 8,951). Extensive comminution from processing, with almost all bone (99.2 %, n = 8,974) being less than 50% intact and 96.9% of specimens (n = 8,771) being identified as calcined, scorched, or charred, renders genus- and species-level identifications difficult. Owing to the volume of highly fragmentary materials recovered and practical, budgetary constraints, a selective process was undertaken during the cataloguing of this assemblage prioritizing species-level identifications for bones of large mammals—roughly speaking, anything small artiodactyl-sized or larger—to allow cross-site comparison with the big game species identified by Johansson (2013) at Promontory Cave 1. Although proportionally larger elements and intact articulations are present on the bones of smaller animals, many of these specimens presently remain only cursorily identified to the level of family or order (i.e., Leporidae, Rodentia, and Aves [birds] of varying sizes), most of which are consequently excluded from the total NISP is this discussion. The NISP presented here should therefore be viewed as accurate only for the large mammal species, an intended result of the research focus.

The most conspicuous research finding is that bison, abundant at the Promontory Caves and thus perhaps expected to be abundant at other nearby sites on Promontory Point, are exceedingly scarce (NISP = 5). No more than one identifiable specimen was found in any component. Individual elements are not duplicated among these five specimens, but one specimen belonged to a subadult, while the remainder were adult. There is thus a site-wide MNI of two, or five (one per component) if specimens from different components are counted as bones from different individuals (see discussion of maximal vs. minimal distinction in Grayson 1988 and Chapter 2; specimens from the trench and test pits are counted here and in the following discussion with their equivalent component, by depth, in the main excavation area). There is no indication that anything more than opportunistic hunting of single bison took place during any era at Chournos Springs, nor can the various occupants of the site at any time be described as communal bison hunters.

Other identifiable large game animals include mule deer (*Odocoileus hemionus*, NISP = 37), bighorn sheep (*Ovis canadensis*, NISP = 15), and pronghorn (*Antilocapra americanus*, NISP = 6). While much of the remainder was identifiable as highly processed artiodactyl or other large mammal bone (NUSP = 1531), none of these fragments were identifiable as being from large artiodactyls that could include bison. Fragments most likely belonging to small artiodactyls (NUSP = 541) such as deer, sheep, and pronghorn were common. Analytical potential is limited from such highly comminuted faunal remains, with the very low number of complete, identifiable bone elements rendering it difficult to estimate MNIs, and thus to assess dietary contributions of the more thoroughly analyzed big game animals represented at the site. Of the identifiable specimens, no individual bone elements were repeated for pronghorn or bighorn sheep, suggesting a minimum site-wide MNI of one (or, maximally distinguished by component, three pronghorn and two sheep). The number is slightly higher for mule deer: two distal right tibias were recovered from Component C1, giving a site-wide MNI of two, or six if maximally distinguished by component. As with bison, only opportunistic, small-scale hunting is indicated at any time.

MNIs for smaller game animals cannot reliably be determined from the present level of analysis. Thus, any calculations commonly used to make cross-site assessments of food procurement strategies are liable to be misleading. For instance, following the reasoning that smaller game was less desirable than animals which produced higher meat yields, a number of indices have been developed to explore how hunting intensity or food scarcity may be understood by comparing the amount of small game taken versus big game at a site (Broughton 1994; Grayson 1991; Janetski 1997; for discussion of prey ranking models, see Bird et al. 2009; Bird and O'Connell 2006; Broughton et al. 2011; Lupo 2007; Ugan 2005; Ugan and Simms 2012). The artiodactyl index (AI) applied by Janetski (1997) to explore resource intensification due to population increases among Fremont groups of the eastern Great Basin, weighs the number of identifiable artiodactyl specimens against lagomorph specimens, using the formula

(NISP + NUSP artiodactyl) + NUSP large mammal/NISP + NUSP lagomorph = AI

as a readily calculated means of comparing sites at a glance. The formula yields a value between 0 and 1; the closer the number is to 1, the more available big game would appear to be, and the more abundant food would appear to be overall. Applying this calculation to the Chournos Springs assemblage yields an AI of 0.99, a value that would imply extraordinary food abundance, but which is artificially inflated in part because small mammal bone has not yet been fully identified. Even if all the few dozen small mammal bones that have presently been identified to the order of Rodentia are in fact lagomorph specimens, this does not significantly change the indexed result, owing to the sheer number of highly comminuted large mammal bone specimens recovered at the site.

The extraordinary degree of comminution at the site undermines the utility of the artiodactyl index by grossly inflating the NUSP of artiodactyl and large mammal bone fragments (cf. Outram 2004): these larger bones, when pulverized, produce far more fragments than the bones of smaller mammals such as rabbits and rodents, resulting in an inevitable metric skew that would suggest an almost single-minded reliance on larger game. A more conservative means of assessing large versus small game capture would be to exclude heavily fragmented bone entirely, and only to compare bone that has been positively identified to the level of species or genus:

$$NISP\ large\ mammal / NISP\ small\ mammal = AI_{mod}$$

The value of this more equitably weighted index is 0.69, still leaning comfortably towards a reliance on artiodactyls, but not so preferentially as the unmodified index might suggest. More comprehensive analysis must await a more complete assessment of the small and medium-sized mammal and non-mammal bone from the site.

Regardless of what index is used, it must also be asked whether the considerable bone fragmentation might serve as a meaningful indicator of food stress rather than more general food preference. The sheer extent of fragmentation at Chournos Springs indicates that bones underwent extensive processing before entering the site's extensive midden deposits, probably in preparation for boiling to render grease (Outram 2001, 2004), as may also be indicated by the extensive evidence of calcined, burned fragments and large quantities of fire-cracked rock. The use of milling stones to pound selected small animal bones, especially vertebrae, sacra, and longbone ends, was ethnographically observed by Steward (1941:232, 1943:304, 364) among the Nevada, Lemhi, Grouse Creek, Promontory Point, Cache Valley, and Skull Valley Shoshone, the Bannock, and the Pahvant Ute. This processing behavior has elsewhere been observed to have removed many identifiable elements from Great Basin archaeological assemblages (Hockett 1994:109). Such highly visible attempts by the people at Chournos Springs to extract every calorie possible from the game they obtained, both large and small, are a far cry from Promontory Cave 1, where, though longbones were frequently splintered for marrow extraction (Johansson 2014), virtually no processing of bone for grease rendering is indicated, fire-cracked rock is absent, grinding stones are scarce, and whole, grease-rich bones were even burned as fuel. Despite what evidence exists for a preference for artiodactyls over smaller mammals at Chournos Springs, the site's inhabitants appear to have undergone considerable food stress.

Indices such as AI alone do not adequately convey this aspect of food stress or extraction intensity. Such values may perhaps better be considered in conjunction with other assessments to indicate the intensity of bone processing and grease rendering, such as a 'percent identifiable' ratio of total bone fragments to NISP (Gifford-Gonzalez 1989) or 'percent completeness' of individual bone elements (Morlan 1994), both of which can be examined in future analyses. Overall, the total number of animals harvested at Chournos Springs appears to be quite low, and portions of only single large game animals appear to be present at any point in time. This might be indicative of a number of things, either singly or in some combination: small overall population size, with a lower capacity for the capture of big game; sparse game quantities, contradicted somewhat by the abundance of bison bone at Promontory Cave 1; semi-sedentary occupation, with only a seasonal presence at the site; or more broad-spectrum subsistence to which meat from game mammals contributed relatively little to the overall diet. This last point may be most relevant, especially if considered in tandem with ideologically and ceremonially backed sanctions that rendered hunting of some species accessible only to certain individuals and groups (Oetelaar 2014), and with the possibility that large herds of bison were perceived by some non-specialists as an object of fear that were safest avoided (D. Gunnerson 1972).

Not to be overlooked in this discussion are the high numbers of avian bone specimens present at the site, which like the small mammal bone have not yet been identified to the level of species. Birds of differing sizes were taken at each stage of the site's occupation, from the Archaic period onwards, likely associated with hunting in the adjacent wetland. In addition to suggesting a further limitation in reliance on large game, this portion of the faunal assemblage may serve as an indicator of seasonality of site occupation (cf. Parmalee 1979), a potentially informative avenue for future inquiry. Of particular note are the 82 avian bone specimens from the middle and upper fill of the trench through Depression 1, which may indicate an intensification of reliance on wetland resources in the period postdating the main structure's abandonment. Other evidence for reliance on wetland resources is to be found in the trace amounts of charred edible seeds recovered through bulk sediment flotation (Puseman 2015), discussed below.

Taken as a whole, the faunal assemblage at Chournos Springs does not yield easy comparisons to other sites in the immediate region, in part owing to the exceptional degree of comminution. In terms of identifiable specimen frequencies, bison hunting seems more comparable to the scant specimens in the Late Holocene Stratum V at Danger Cave (NISP of 8 out of 882; Grayson 1988) and less so to the multiple individuals in the Formative period Unit III deposits at Hogup Cave (MNI of 7 out of 303; Aikens 1970). These observations are little more than vague impressions, however, limited by the poor comparability of cave settings where faunal remains become vertically stacked in a constrained space to open-air settings where middens can sprawl outward over an indeterminate distance. It may also be that an open-air setting is more conducive to intense processing activities like grease rendering, given challenges of transporting boiling or roasting stones to a high-elevation cave, procuring sufficient fuel to heat them, procuring and transporting water for boiling, and preventing fires from getting out of control in highly flammable cave deposits.[23] Other taphonomic factors like carnivore gnawing and bone consumption—canid bones, possibly domesticated dog, are weakly represented in the midden deposits (n = 2)—have had an unknown effect on faunal preservation.

The approach that has been explored in Chapter 2 of this work, which compares dressed meat weights estimated from the total number of animals taken by hunters over a period of time (following Aikens 1970) is difficult to apply at Chournos Springs. Two prerequisites are needed to make such an attempt: clearly defined strata and accurate boundary dates for each period of occupation. Reliable dates, however, are presently available only for Component B1, with Bayesian modelled occupational boundaries of ca. AD 985–1255; faunal materials in the overlying fill, though stratigraphically associated with dates for structural charcoal from the pit house, were likely deposited after the structure's abandonment and collapse. Though they are presumed to be chronologically sorted, the overlying and surrounding midden deposits can only be bracketed with confidence between the onset of the pit house's occupation and the end of the Promontory Phase of the Late Prehistoric period, as late as AD 1600 (Janetski and Smith 2007). Also, the faunal remains recovered from Component B1 may not fully represent the dietary patterns of the structure's occupants over such a lengthy period, as the structure was likely periodically cleaned, with refuse dumped in exterior middens. Any midden deposits from *outside* the pit house area, then, could include cleanout debris from this or other residential structures, where far less chronological control exists, thus eliminating their utility in calculating an index of hunting yields.

The measures of hunting intensity given in Table 5.15 for Component B1 and the overlying fill (Components B2, C1, and C2) are therefore presented with these several caveats. To account for the exterior midden problem, the calculations cover overlapping time periods, ca. AD 985–1255 and AD 985–1600. These values also carry the same limitation as the rest of this

Table 5.15. Proportions of dressed meat weight and hunting intensity index for Formative and Post-Formative occupations, Chournos Springs (following Aikens 1970). Weights are for maximally distinguished MNIs.[24]

	Proportion of dressed meat weight (%)								
Component (Period)	Pronghorn	Bison	Deer	Sheep	Lagomorphs	Rodents	Carnivores	Total Dressed Meat Weight (kg)	Hunting Intensity Index (kg/ka)
B1 (ca. AD 985–1255)	4.5	74.2	11.3	10.0	0	<0.1	0	550.4	2,038.5
B2, C1, C2 (ca. AD 985–1600)	2.1	69.6	21.1	4.7	0.3	0.5	1.8	1,173.8	1,908.6

discussion, in that low-yielding small mammals and birds have not yet been fully identified and are therefore underrepresented (for small mammals) or absent (for birds) in the MNIs from which the dressed meat weights have been calculated. Given their generally low weight, their omission should not greatly alter these figures, however. The single stray date, from bone, indicating an earlier Archaic-aged presence at Chournos Springs is meanwhile insufficient for bracketing the duration of Component A, for which no indexed value of hunting intensity can therefore be given.

The calculated hunting intensity indices for the structure floor and overlying midden are quite closely comparable to one another, possibly with slightly decreased intensity of occupation in the Late Prehistoric. The latter figure should be treated with some caution, however, as the duration of time used to calculate this index is a conservatively long estimate, and the game present may have been harvested over a shorter period. Likewise, while both periods of occupation exhibit index values very near that calculated for the Late Prehistoric period at Hogup Cave of about 2,000 (Aikens 1970; Table 2.7), the figures presented here are from a limited excavation area, and more extensive excavation of the midden deposits at Chournos Springs may yield greater MNIs, and thus a higher hunting index value.

Despite all this, there is no reason at present to suspect that hunting intensity at Chournos Springs ever approached the level seen at Promontory Cave 1, which was orders of magnitude greater. Throughout both periods, game appears to have been obtained through small-scale encounter hunting, and the rarely harvested bison would have presented an exceptional windfall—a pattern that appears typical of the Great Salt Lake margins through much of the Formative and Late Prehistoric periods. While the figures obtained here compare favourably to Hogup Cave, a more likely analogy may be sites in the Bear River and Willard Bay wetlands where a broad spectrum of available resources were utilized, as the diverse but not yet fully explored avifauna record may indicate. The possibility of seasonal occupation, as may be captured in the faunal record, also merits some consideration.

Shell

Small fragments of freshwater mussel shell were a common occurrence throughout the excavated area, being found in the underlying Archaic deposits, the overlying midden, the test trench, and at varying depths in two test pits. The notable exception is Component B1, the structure floor (Table 5.16), in keeping with a general paucity of exotic materials associated with this occupation.

The specimens were often in a very poor state of preservation, consisting of exfoliating, laminated shell fragments that cannot withstand a great deal of handling. Shapes include triangular, rectangular, trapezoidal, and teardrop-shaped pieces ranging in size from 2.5–19.7 mm in length. In all but one instance, only the nacreous interior shell layers were recovered. While most fragments are now a dull white, two specimens have preserved their highly iridescent sheen.

Table 5.16. Distribution of freshwater mussel shell fragments, Chournos Springs

Component	Total Count	Total Weight (g)
A	8	0.2
B1	-	-
B2	15	0.1
C1	8	0.1
C2	9	0.5
Depression 1 (Middle)	7	<0.1
Test Pit 1 (Middle)	1	0.1
Test Pit 2 (Lower/Middle)	4	<0.1
Wall/Spoil	1	<0.1
Total	**53**	**~1.0**

Three genera of freshwater mussel were historically present in Utah: the California floater (*Anodonta californiensis*) or winged floater (*Anodonta nuttalli*), now regarded as a single, macroscopically indistinguishable clade (Chong et al. 2008; Jepsen et al. 2010*a*; Mock et al. 2010; Nedeau et al. 2009), the western ridged mussel (*Gonidea angulata*; Jepsen et al. 2010*b*), and the western pearlshell (*Margaritifera falcata*; Jepsen et al. 2010*c*). A number of common characteristics make small fragments difficult to distinguish from one another, although one specimen at Chournos Springs possesses a prominent longitudinal ridge characteristic of *Gonidea angulata* (FS 697.1) and another possesses concentric, undulating ridges characteristic of *Anodonta* spp. (FS 199.1).

All three mussel genera (sometimes referred to as clams) were harvested aboriginally as a foodstuff, and their shells were used in both tools and adornment (Drews 1990; Jepsen et al. 2010*a*, *b*, *c*). Freshwater mussels have a larval stage that is parasitic on fish, and so a life cycle that is dependent on variously fast or slow moving riverine or lakebed habitats, locally restricted to the Bear, Weber, Jordan, and Provo river systems, Utah Lake, and, prior to its destruction in 1948, Hot Springs Lake near Salt Lake City (Hovingh 2004; Richards 2014:3–5). Farther afield, these species can also be found in the Snake River (Johnson and Plew 2016) and Humboldt drainages (Drews 1990). The Great Salt Lake is too saline to support fish species, and the freshwater habitat at Chournos Springs could not support the full life cycle of these mussels. The absence of large, complete shells is consistent with their being harvested and processed outside the travel threshold of daily foraging activity (Bettinger et al. 1996:897), and their presence here is likely the result of use as tools or adornment and possibly as a trade good or item collected during a seasonal round rather than as an element of dietary consumption. If, as Jeremy Johnson and Mark Plew (2016) have suggested, mussels would have been particularly sought after during the late winter or spring when other resources were unavailable, this may indicate when the people at Chournos Springs were *not* resident at the site.

In addition to the mussel specimens, a small (6.1 mm), tightly spiraled non-pulmonate snail shell (*Fluminicola* spp.) was found on the Component B1 surface. Numerous species of gastropods inhabit freshwater springs in Utah (Hershler and Frest 1996), and the snail shell's presence here is likely incidental to transport of other material from the adjacent wetlands, either for food, fuel, or construction (cf. Drews 1990:71).

A single 5.1 mm fragment of what appears to be eggshell was found in the uppermost midden (Component C2). It has a pale brown, slightly vesicular exterior and a thickness comparable to chicken egg. Its significance is uncertain: the absence of other similar material and its shallow provenience raise the possibility that it is an intrusive, modern specimen.

Macrobotanicals

Seven bulk sediment samples were collected from selected surfaces, features, and contexts during the 2013 and 2014 excavations. After flotation, residual dried light and heavy fractions were analyzed by Kathryn Puseman (2015). Identifiable macrobotanical material consisted of charcoal fragments, for which species-level identification was usually possible, as well as charred and uncharred macrofloral remains such as seeds (including perisperm and caryopses) and florets. In addition, most float samples yielded moderate numbers of uncharred seeds and seed fragments (typically 25–40 specimens per float sample), usually *Chamaesyce* spp. (sandmat) and various Chenopodium/Amaranthaceae ("Cheno-Am") seeds reflective of modern ground cover and limited soil disturbance or bioturbation. Exceptions are noted in Table 5.17.

Every flotation sample from Chournos Springs yielded charred seeds that, while often identifiable only to the level of family, includes species that were potentially used as a food resource. Edible Cheno-Am species include *Chenopodium* spp. (goosefoot, pigweed) and *Allenrolfea occidentalis* (iodine bush or pickleweed) that yield large numbers of seeds which can be eaten raw or parched and ground into flour (Herzog and Lawlor 2016; Kershaw 2000:202-03; Kirk 1975:56-63; Sweet 1976:48; Tilford 1997:14-15, 88-89). Similarly, *Atriplex* spp. (saltbush), *Scirpus* spp. (bulrush, tule), and various Poaceae (grass) seeds, including *Achnatherum hymenoides* (ricegrass) could be roasted and ground into meal or flour for a variety of uses (Kershaw 2000:213; Kirk 1975:59-60, 175–76; Moerman 1998:115-17, 521–24; K. Rainey and Adams 2004; Sweet 1976:27). Frequencies are generally low, however, making it difficult to judge with any certainty whether the specimens observed represent food gathering and processing activity or incorporation of inflorescence and seed-bearing stalks into thatching and matting material that subsequently

Table 5.17 Charred macrobotanicals from bulk flotation samples, Chournos Springs (adapted from Puseman 2015).

				Qty.*		
Sample no.	**Vol. (L)**	**Description**	**Part**	**W**	**F**	**Component/Feature, Notes**
FS 416	0.15	Cheno-am	Perisperm		1	C1, above and around Adobe Concentration 1, 12–15 cm b.s.
		Chenopodium spp.	Seed	1		
		Poaceae	Stem		X	
		Achnatherum hymenoides	Floret		1	
		Phragmites australis	Stem		4	
		Acer spp.	Charcoal		3	
		Artemisia spp.	Charcoal		25	
		Juniperus spp.	Charcoal		8	
		Sarcobatus vermiculatus/ Allenrolfea occidentalis	Charcoal		4	
FS 440	0.14	Poaceae	Stem		X	B2, within Adobe Concentration 1, 15–21 cm b.s.
		Poaceae	Rachis		1	
		Poaceae, large	Caryopsis	5	4	
		Poaceae, small	Caryopsis	2		
		Phragmites australis	Stem		24	
		Acer negundo	Charcoal		25	
		Juniperus spp.	Charcoal		7	
		Salicaceae twig	Charcoal		4	
		Sarcobatus vermiculatus/ Allenrolfea occidentalis	Charcoal		4	
FS 563	0.26	Cheno-am	Perisperm		1	B1, surface of Floor 1, 23 cm b.s.
		Poaceae	Stem		X	
		Poaceae, small	Caryopsis	2		
		Phragmites australis	Stem		3	
		Acer negundo	Charcoal		38	
		Asteraceae	Charcoal		1	
		Artemisia spp.	Charcoal		1	
FS 728	>1.0	Cheno-am	Perisperm	2	1	B1, surface of Floor 1 beneath Adobe Concentration 2, 23 cm b.s. Scarce uncharred seeds (n = 3).
		Atriplex spp.	Seed	1	1	
		Chamaesyce spp.	Seed	1		
		Poaceae, small	Caryopsis	4	1	
		Phragmites australis	Stem		64	
		Scirpus-type	Seed	2	7	
		Artemisia spp.	Charcoal		1	
		Salicaceae	Charcoal		8	
		Sarcobatus vermiculatus/ Allenrolfea occidentalis	Charcoal		36	
FS 798	>1.0	Poaceae	Caryopsis	1	2	C2, fill above possible metate (FS 810.1), 4–5 cm b.s. Abundant uncharred macrobotanicals (n = 88)
		Poaceae, small	Caryopsis	1		
		Phragmites australis	Stem		7	
		Acer negundo	Charcoal		7	
		Artemisia spp.	Charcoal		9	
		Juniperus spp.	Charcoal		1	

Table 5.17, cont'd.

Sample no.	Vol. (L)	Description	Part	Qty.* W	Qty.* F	Component/Feature, Notes
		Pseudotsuga menziesii	Charcoal		3	
		Rosaceae	Charcoal		2	
		Salicaceae	Charcoal		8	
		Sarcobatus vermiculatus/ Allenrolfea occidentalis	Charcoal		10	
FS 823	>1.0	*Chenopodium* spp.	Seed	1		B2, fill of Pit 2, 13–16 cm b.s.
		Juniperus spp.	Seed		1	Scarce uncharred
		Poaceae, small	Caryopsis	5		macrobotanicals (n = 3)
		Atriplex spp.	Charcoal		2	
		Sarcobatus vermiculatus/ Allenrolfea occidentalis	Charcoal		38	
FS 856	>1.0	*Chenopodium* spp.	Seed		1	A, fill of Pit 1, 24–26 cm b.s.
		Artemisia spp.	Charcoal		1	
		Salicaceae	Charcoal		8	
		Sarcobatus vermiculatus/ Allenrolfea occidentalis	Charcoal		36	

* W = whole; F = fragment; X = presence noted in sample, but not counted

burned, especially when found incorporated into or beneath such features as Adobe Concentrations 1 and 2 (as with FS 416, 440, and 728). The abundance of charcoal fragments and charred Phragmites stem fragments in each float sample adds to this difficulty. At the very least, the presence of charred, edible seeds points to the availability of these food resources, an anticipated finding given the ubiquity of groundstone in the site area.

The presence of *any* charred edible macrobotanical remains provides an interesting contrast to Promontory Cave 1. There, David Rhode (2017) has identified extremely abundant numbers of edible seeds in bulk sediment samples (particularly of bulrush and ricegrass, ranging from less than 500 to 3000 seeds/liter), but despite this abundance, there is no evidence of preparation for dietary use through milling, crushing, or parching. Instead, whole grasses and rushes appear to have been transported into the caves as bedding and matting material, with some volume of seeds also transported by rodents.

Five of the seven float samples yielded charred stem fragments from the common reed, *Phragmites australis*—up to 64 beneath Adobe Concentration 2, in addition to the large segments excavated *in situ* and dated separately (FS 834, 890 ± 20 ^{14}C yr BP; Fig. 5.17). As discussed in Chapter 6, split cane dice are the most frequently encountered artifact type among the ubiquitous gaming paraphernalia at the Promontory Caves; these are made from stem segments of phragmites. Though it is not expected that such artifacts would survive intact at Chournos Springs to show a relationship between the occupants of the sites, the presence of the species itself is noteworthy. The native habitat of the North American phragmites subspecies, *P. a. americanus*, is restricted to "the landward margins of tidal salt marshes, brackish marshes of river deltas, alkaline or saline inland wetlands, springs, seeps, oases, and marshes in arid areas" (Kiviat and Hamilton 2001:342). In the vicinity of the Promontory Caves, phragmites appears to be somewhat uncommon; only small stands have been observed, and these are located along the highwater mark at Chournos Springs (Fig. 5.27). While it is possible that this is a stand of an invasive subspecies, *P. a. australis*, that has been spreading aggressively in urbanized areas of the Great Salt Lake and Utah Lake wetlands (Berger 2009), primarily native haplotypes still persist along rivers and desert springs (Saltonstall 2003:449). Chournos Springs may well be among the sources of the cane from which the dice and other artifacts such as arrow shaft segments at the Promontory Caves were made.

Noting that the soil and spring water biologically available to phragmites at this locale are linked to the alluvial fan and upland outwash from the south spur and main body of the Promontory Mountains east of the site, geological differences can be noted between the primarily

Figure 5.27. Stand of *Phragmites australis* at Chournos Springs.

granite and quartzite bedrock there and the limestone of the north spur in which the Promontory Caves are set (Jay Quade, pers. comm., 2013). Proportions of the two most common isotopes of strontium, ^{87}Sr and ^{86}Sr, vary geographically in local bedrock, groundwater, and soil based on local geologic conditions (Dasch 1969; Faure 1986), and due to their slight variation in atomic weight, they do not fractionate in biological processes. Thus, the ratio of ^{87}Sr to ^{86}Sr present in organic tissues, while varying in concentration by tissue type, consistently reflects the isotopic composition of the geology local to nutritional sources, which can include both food and drinking water for animals or soil and groundwater for plants (E. Miller et al. 1993; Price et al. 1994; R. Bentley 2006). Plants in particular can exhibit considerable heterogeneity over small geographic areas based on proximity to water sources and highly localized soil conditions (Price et al. 2002). The possibility of comparing the isotopic strontium content of cane samples from the caves and from Chournos Springs remains an intriguing avenue for future study.[25]

Trace quantities of Douglas fir (*Pseudotsuga menziesii*) charcoal in the float sample from the uppermost fill (FS 798) are considerably beyond the modern range of this species: the nearest stands of Douglas fir are in the Wasatch Range east of the Great Salt Lake (Little 1971; R. Thompson et al. 1999). Their presence is not altogether surprising, though. These are probably fragments of the large burned beam, possibly a railway tie, found in the modern hearth about 2 m from where this float sample was collected. They can be added to the list of other indications of some churn in the uppermost fill at the site.

Notable for its absence is any indication of maize in the macrobotanical samples from the structure floor and overlying fill. This is surprising, given the early dates for the structure's construction that precede the ca. AD 1150 abandonment of corn horticulture in the Great Basin (Benson et al. 2007; Coltrain and Leavitt 2002; Figure 5.20), and given the recovery of two maize kernels from profile cleaning of Steward's excavation area in Promontory Cave 2 (Rhode 2017). However, this absence should perhaps not be considered conclusive, given the limited scope of the excavations undertaken at the site thus far.

Summary

Human occupation of the Chournos Springs site began at least in the Archaic period. Because these deposits were not extensively tested, little can be said about the earliest known occupants of the site, including when precisely this stage of occupation began. That groups of people resided here by the Archaic period is known from the lack of ceramics in the deepest-buried cultural materials found, the use of large corner-notched Elko projectile points, and from a single radiocarbon date from bone collagen of 1705 ± 15 ^{14}C yr BP, taken from a lagomorph longbone specimen found in a displaced context. Archaic-period peoples at the site made use of proximate obsidian sources to the north and northwest (Malad, Brown's Bench, Brown's Bench–Coal Bank Spring, and Walcott Tuff), the latter two of which are only represented in deposits from this period, along with the highest frequency of utilization of chalcedony type *d*, a vuggy light grey-brown material with distinctively layered, opaque white, tan, or pink internal flowery splotches. These people's participation in a local manifestation of the same broad iconographic tradition as seen at other locales in the central and southern Great Basin is indicated by the occasional presence of incised stones (n = 2), both specimens of which are haphazardly scratched and lack the pseudo-handle termini of later specimens. As in later periods, they had a varied subsistence that included large mammals, small mammals, and birds, and only rarely featured bison. Only a single weakly defined feature, Pit 1, is associated with this stage of occupation.

Sometime around AD 1000, a shallowly subterranean, wood-framed and adobe-plastered pit house was constructed at the site. Radiocarbon dates both from structural wood and short-lived species such as phragmites show that a structure was maintained at this spot for more than 200 years. In the mid-13th century, around the same time as peak occupation of the nearby Promontory Cave 1 was getting underway, the structure was burned, leaving large sections of collapsed beams, firing large chunks of the adobe on the walls, and preserving sections of the pit house's prepared earth floor and a post set in the adjacent exterior surface. The exclusive presence of highly decorated, sand-tempered pottery on the structure floor and the use of Cottonwood Triangular projectile points, in addition to a Desert Side-Notched point, show that the residents of this structure were participants in the Great Salt Lake Fremont cultural tradition, particularly as seen in the Bear River wetlands. More specifically, this time period may be considered the terminal Fremont era in the Great Salt Lake, straddling the prolonged drought ca. AD 1150 that may have played a significant role in people's decisions to abandon maize horticulture in favour of wetlands foraging (Coltrain and Leavitt 2002). Traces of food preparation and subsistence patterns are scarce within the structure itself; small numbers of charred seeds, coupled with groundstone implements, substantial quantities of fire-cracked rock, and quantities of highly comminuted antelope, bison, deer, sheep, bird, rabbit, and rodent bone point to a varied diet and a degree of food stress. This varied diet presents one of the greatest points of contrast with the lifestyle of the people at Cave 1.

In keeping with the placement of Fremont sites on rich alluvial deposits above wetlands around the northeast part of the Great Salt Lake where maize horticulture was practiced (Coltrain and Leavitt 2002:464), it would not be surprising to find that maize was grown for a time at Chournos Springs. However, no direct evidence of this practice has yet been found. The narrow strip of boulder-free land at the toe of the alluvial fan where the site is located may have provided enough space to for some limited horticulture, but abundant groundstone objects here could also have been used for the milling of wild seeds, roots, or even bones.

The full extent of Fremont-era occupation at Chournos Springs is not yet known, but the lateral extent of artifacts on the surface and additional test units that produced extensive Fremont-affiliated pottery show that it was almost certainly not limited to the single habitation so far unearthed. Indeed, the odds of encountering the only pit house floor by transecting just one of the many shallow, basin-shaped depressions at the site seem astronomically low. It seems far more likely that Chournos Springs was the residential base, seasonally at least, of a multiple-household population, and the extensive midden-like deposits extending beyond the boundaries of the one structure so identified, and within the overlying “floor zone” fill, provide a glimpse at just how varied this community might have been.

Settlement at Chournos Springs also continued after the pit house was destroyed, during what must have been the Late Prehistoric period, given the timing of the structure’s last use or modification. Understanding of the later stages of human settlement here is hampered by limited deposition and a lack of intact, dateable cultural features, but it is clear that people’s way of life had changed. Influences from the Promontory culture are suggested by the increasing prevalence of calcite-tempered ceramics and Desert Side-Notched projectile points in the uppermost fill at the site; the appearance of several calcite tablets, raw material in the production of calcite-tempered pottery, hearkens to similar finds at the Orbit Inn site northeast of the Bear River wetlands, where people lived in ephemeral, wickiup-like surface structures (Simms and Heath 1990). Lithic source utilization increased considerably in this later period, as did the diversity of ceramic production and use of material like mussel shell, all pointing to increased residential mobility and geographic range after a period of relative sedentism, as expressed in the material from the pit house floor. Artifacts associated with the earlier Fremont occupation persist in the later deposits as well, though, including sand tempered grayware and Bear River Side-notched points. The people during this time appear to have participated in the same iconographic incised stone tradition as seen at other late sites around the north end of the Great Salt Lake, from Hogup Cave (Aikens 1970) to the Bear River wetlands (Fry and Dalley 1979), but with a notable lack of the anthropomorphic figures seen in incised stones from the Promontory Caves. The varied nature of subsistence patterns did not change substantially at this time, but groundstone may have been less in use, and many pieces from the latest era show recycling for use as FCR. As at earlier times, bison did not appear to play as dominant a role in diet as seen at the caves. That these later deposits show more similarity to Late Prehistoric sites in the Great Salt Lake wetlands, and in some respects to Utah Valley (see discussion of ceramics in Chapter 7) than they do to the Promontory Caves, is of considerable interest.

That a post-horticultural Fremont settlement existed on Promontory Point is itself a significant finding; the inhabitants of this settlement in the early 13th century A.D. appear to have been at least semi-sedentary hunter-gatherers harvesting a broad spectrum of both game and plant resources—in other words, what Madsen and Simms (1998) have referred to as Fremont foragers. That this occupation appears to have been contemporaneous with, and yet so different from the inhabitation of the Promontory Caves—distinctive in terms of material culture, subsistence strategy, and settlement patterns—is suggestive of cohabitation of the area by two distinct cultural groups. Much work remains to be done to assess the timing of the later deposits at Chournos Springs, but if Fremont and Promontory materials are truly as intermingled as they appear to be, one likely conclusion is that a gradual transition occurred at the onset of the Late Prehistoric, characterized by the coalescence of two previously distinct cultural traditions, with implied differences in language and ethnic identity, wherein the mixing represents the transfer of materials and ideas, or movement of individuals themselves, between groups.

Chapter 6: Mobility, Exchange, and the Fluency of Games—Gambling and Intergroup Contact*

Since the excavation of Utah's Promontory Caves 1 and 2 by Julian Steward in 1930 and 1931 (Steward 1937*a*), questions have existed about the relationship between the caves' big game hunting inhabitants—the forebears of the Promontory Phase peoples who lived down the Wasatch Front until A.D. 1500—and the farming and foraging Fremont Complex peoples who resided in the Great Salt Lake area until about A.D. 1300 (Aikens 1966, 1967*a*, 1967*b*; Dean 1992; Forsyth 1986; Gunnerson 1956, 1960; Ives 2014; Janetski 1994; Janetski and Smith 2007; D. Madsen 1979*b*; D. Madsen and Simms 1998; Simms et al. 1997; Simms and Heath 1990; G. Smith 2004). Our work on Promontory Point since 2011 has elaborated Steward's (1937*a*:86) observation that a number of traits of the Promontory people are unmistakably northern in character, suggesting they were a migratory population with roots in Dene (Athapaskan) communities of the Canadian Subarctic, well acquainted with a Plains bison hunting lifestyle, and in the process of adapting to the Desert West (Ives 2003, 2014). Steward was remarkably prescient in arguing that the Promontory and Fremont peoples were contemporaries; Bayesian modeling of a suite of 95 AMS 14C dates from Promontory Cave 1 shows a tightly constrained period of occupation between A.D. 1240–1290, prior to the end of the Fremont era (Ives et al. 2014). Prospects for Promontory–

* The contents of this chapter are a revised version of two chapters previously published in *Prehistoric Games of North American Indians: Subarctic to Mesoamerica* (Voorhies 2017). The bulk of this chapter appeared as Chapter 9 of that volume (Yanicki and Ives 2017); the section entitled "In- vs. the Out-Group: The Social Significance of Games" is from Chapter 7 (Yanicki 2017). Notable amendments to the earlier versions are made here to the sections on bone gaming pieces and stick dice.

Fremont interaction are supported by our identification of an unreported Fremont settlement nearby, Chournos Springs (42BO1915), occupied when the Promontory Culture peoples arrived.

Generally overlooked in discussions of the Promontory phenomenon is the rich array of gaming material present in the largest and more intensely occupied of the Promontory Caves, Cave 1 (42BO1). The ethnographic and historic literature on the games of indigenous North Americans provides ample basis for their consideration in interactions both within and between groups of diverse social, linguistic, and genetic composition. Rather than mere recreation, games were a core aspect of social and ceremonial life; the gambling that almost universally accompanied them was, importantly, preferred between individuals with some degree of social and kinship distance, reaching its apogee at the intertribal level (Culin 1907; DeBoer 2001; Flannery and Cooper 1946; Janetski 2002; Sahlins 1972). The ubiquity of gaming materials in the Promontory assemblage compels us to examine what this may mean for the group composition and internal social dynamics of the Promontory people. While the geographic scope for commonalities in the gaming pieces is vast, fluency in shared gaming traditions would be required for intergroup relations on both a local and regional scale. Gaming materials from the Promontory context can serve as a proxy for sociodemographic interaction, offering a unique perspective on shifts in cultural identities in the northern Great Basin at the end of the Fremont era.

In- vs. the Out-Group: The Social Significance of Games

In his model of reciprocity in traditional economies, Marshall Sahlins (1972:figure 5.1; Figure 6.1) predicted the equitability of trade to be increasingly unbalanced with increased kinship and social distance. Elaborating on Malinowskian and Maussian concepts by defining reciprocity

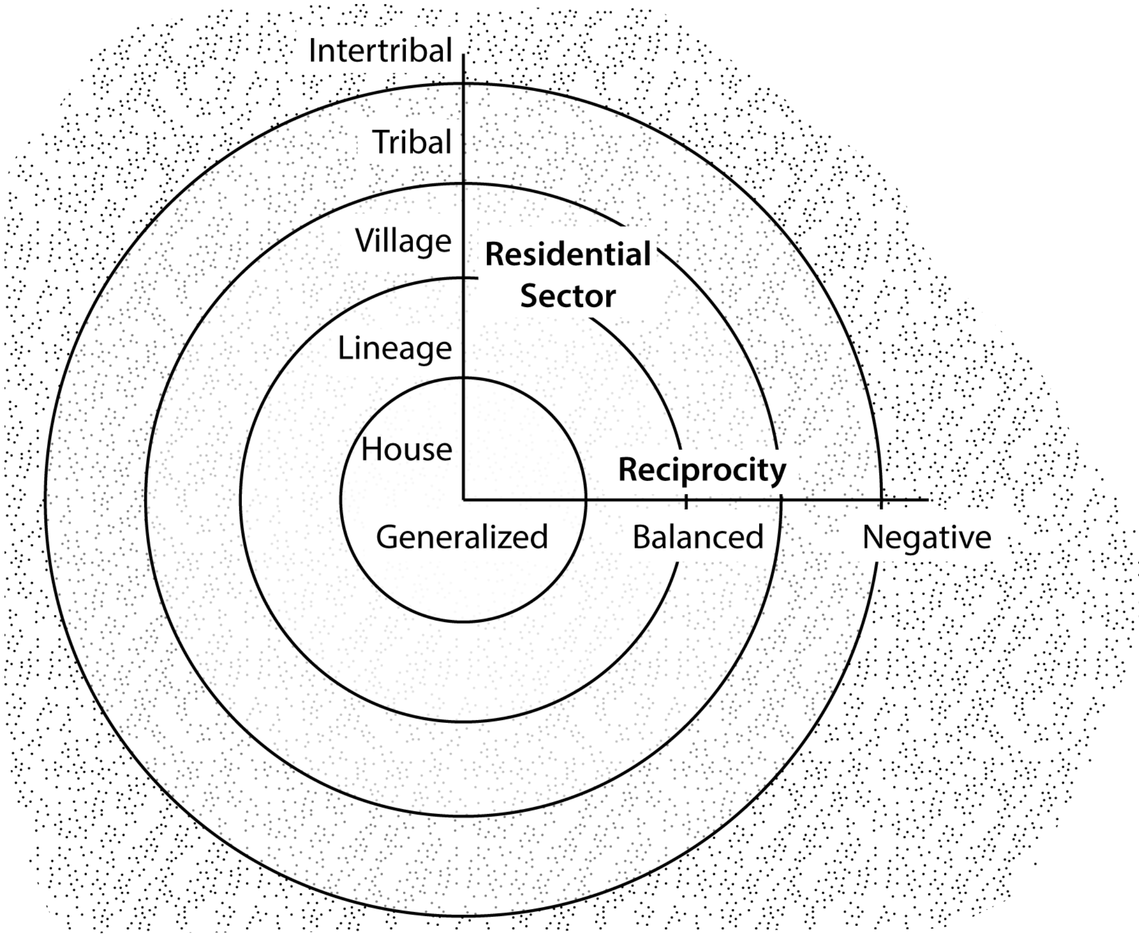

Figure 6.1. Reciprocity and kinship residential sectors. (Redrawn from Sahlins 1972:Figure 5.1.)

as generalized at the household level, balanced within the local community, and negative at the intertribal level (beyond a point, relations would be too hostile for trade to be possible), Sahlins effectively offers a continuum of social actions based on degree of relatedness that can be recognized as altruism, mutual benefit, selfishness, and spite. These four categories of social action, borrowed from the biological literature on social evolution (Bourke 2011; Gardner et al. 2011; West et al. 2007), define the relationship between ego and alter in terms of a net fitness cost or benefit to each. In an altruistic relationship, ego willingly pays a cost for an action while alter gains (–,+); in a mutually beneficial relationship, both ego and alter gain (+,+); in a selfish relationship, ego willingly benefits at the cost of alter (+,–); in a spiteful relationship, both ego and alter are negatively impacted by an action (–,–). Altruism and mutual benefit can collectively be referred to as cooperation; selfishness and spite can be referred to as conflict (Krupp et al. 2010). Gambling is a selfish social action: paraphrasing Sahlins's "negative reciprocity" (1972:195), ego tacitly attempts to get something from alter for nothing with impunity; the potential to as easily lose as win is not quite as self-destructive as all-out hostility, but it is certainly far removed from the altruistic sharing expected among very close kin.

Sahlins's socially ordered continuum of reciprocity is a very literal manifestation of the in-group cooperation and out-group competition addressed in social identity theory (Tajfel et al. 1971; J. Turner et al. 1987), going so far as to recognize multiple contextually relevant levels of group identity that may be salient to an individual at different times (i.e., family or sibling core, kin-group, clan, moiety, society, village, tribe, etc.; cf. Hogg 2006:115). It also mirrors the biological theory of kin selection, wherein reciprocity is considered an adaptive behavior operating at multiple levels of positive and negative relatedness (cf. Bourke 2014; Foster et al. 2006; Gardner 2015; Gardner and West 2004), although it must be noted that kinship relatedness in human societies is defined in socially constructed terms that can operate independently from direct genetic ties.

Sahlins suggested that intertribal out-groups would provide an appropriate degree of social and kinship distance for gambling partners to be found. This is exactly what we see for groups such as the Ktunaxa and the Nakoda, for whom ideal gambling opponents were from other tribes, and in the case of close relations, gambling was frowned upon or even taboo (Brunton 1974; Henry Holloway, in Yanicki 2014:58). In their study of the social parameters of gambling in A'aninin

(Gros Ventre) society, Regina Flannery and John Cooper (1946) proposed several reasons why this should be the case: gambling between individuals who practiced some degree of altruistic sharing, be it a family or clan (i.e., an in-group of closely affiliated kin), "would be 'like winning [property] from yourself'" (Flannery and Cooper 1946:414, citing Goodwin 1942:375). Furthermore, gambling with close kin or community members—the in-group in slightly broader terms—could lead to potentially fractious conflict. Stated preferences for out-group, exogenous gambling affines have been noted across a number of studies; Flannery and Cooper (1946:415) listed the following examples: "Among the Navaho no gambling occurred between relatives or between members of the same clan" (citing B. Haile, pers. comm., 1944); among the Sinkaetku (Southern Okanagan), it was "not right to gamble except with 'strangers'"; among the Kalispel, "[g]ambling is mostly between teams from different villages or tribes." Indeed, DeBoer (2001:233) observed: "The supporting evidence [for intervillage or intertribal gambling] is so abundant (and negative evidence so sparse) that only selected cases need be mentioned." DeBoer listed examples from the Hopi, Klallam, Ojibwa, Nisena, Okanagan, Yakima, Puyallup-Nisqually, Modoc, Kootenay, and Flathead (Beals 1933:354; Brunton 1998:582; Desmond 1952:28–30; Gunther 1927:273; Landes 1971:22; Parsons 1996:10; Ray 1963:124; M. Smith 1940:209; Spier 1938:186–87), while the occurrence of gaming in frontier areas (Leonard 2017; Yanicki 2012, 2014) and in trade fair settings (Janetski 2002; W.R. Wood 1980) greatly reinforces how "gambling can be seen as an in-between or liminal activity, one playing out the ambiguities inherent in alliance, exchange, warfare, marriage, and other relations… who are typically situated far, but not too far, away" (DeBoer 2001:235).

It is this same preference for out-group opponents that we see reflected in the remarkable intersocietal lacrosse contests the earliest American colonists observed in early New England, in which Algonquian peoples played "towne against towne" (Williams 1963:194) or "country against country" (W. Wood 1634:97). In terms of the wagers made in these out-group affairs, William Wood (1634:96) wrote: "It would exceed the beleefe of many to relate the worth of one goal, wherefore it shall be nameleſſe." Roger Williams, the founder of the Providence colony, clarified this point: stakes could include "stringed money [i.e., wampum], clothes, house, corne, and themselves" (Williams 1963:197). Stories of debt slavery arising from gambling losses surface across North America, ranging from a Dakelh tale of a hapless man who wagered and lost his wife and children (Morice 1894:78) to Diné traditions of the Great Gambler who enslaved entire populations (Matthews 1889*a*, 1897; see Cameron and Johansson 2017).

Though stories of high-stakes gambling reinforce the necessity of socially distant gambling partners, the reality of traditional gambling was likely somewhat messier than such a simplified model would imply. Numerous cases can be seen of catastrophic losses not just through out-group gambling, but through in-group gaming, as well: David Thompson (1916:359) wrote that the Piikáni were, "almost to a man, more, or less given to gambling day and night," while Flannery and Cooper (1946) struggled to reconcile ambivalence among the A'aninin for intragroup gambling despite its potential to foment discord. Wood's (1634:96) observation among New England Algonquian groups that "[t]hey are so bewitched… that they will looſe ſometimes all they have" is echoed in Warren Ferris's observations of the Bitterroot Salish hand game in 1831: "Instances of individuals losing everything they possess are by no means infrequent…. The women are as much addicted to gaming as the men" (Ferris 1940:79). Describing Native American gambling on the Montana frontier in 1857, Granville Stuart wrote:

> Gambling was a popular pastime.... Usually the gambler has a pile of his belongings beside him and will wager first one article and then another, and the pile grows or diminishes as luck is good or bad. It is no uncommon thing to see one man in camp with about everything in his possession and the next day perhaps be almost naked, having lost one day what he has won the day before. [G. Stuart 1925:127–29]

These stories of catastrophic gambling losses might allude to the addictive nature of gambling and its potential to override social constraints; even so, they do not reach the extremes of gambling for scalps, wagering away wives and children, or personally becoming the slave of a kinsperson or other closely affiliated group member.

One might suppose that winnings and losses could balance out over the long term with in-group gambling, approximating if not mutual benefit, then at least a zero-sum game. Such reasoning veers dangerously close to the *gambler's fallacy*—the belief that previous losses or wins have any bearing on future contests—and rests on a further unsound supposition that the games being played were balanced towards an equal probability of outcomes. In practice, scores in games of chance such as dice were not necessarily weighted in accordance with probability (DeBoer 2001), games of skill such as the hoop-and-pole game would tend to be won by more skillful contestants, and outcomes could be affected by sleight-of-hand or cheating—an expected practice in virtually any game, and perhaps not so much frowned upon as accepted as part of what defined one as a good game-player, and so long as a person admitted it gracefully when caught (Cliff 1990). Contestants also had differing perceptions of personal or supernatural power that would add inequalities to contestants' expectations of winning (Brunton 1974). In effect, there is little reason to expect that all gamblers would win as often as others. Instead, it must be stressed that definitions of what constitutes an in-group or out-group identity are fluid. Especially within larger communities, numerous individuals could possess relationships of sufficient social distance, or constitute themselves according to varying social classes (i.e., clans, age-graded societies, etc.), so as to normalize high-stakes intragroup competition.

Flannery and Cooper (1946) meanwhile noted that in-group gambling among the A'aninin, especially between women, was usually for lower stakes: small personal articles or "cooking" duty, for example. Samuel Hearne's ca. 1770 description of a day-to-day hand game in a small Deh Cho group also seems to be of this order:

> When playing at this game, which only admits of two persons, each of them have ten, fifteen, or twenty small chips of wood, like matches, and when one of the players guesses right he takes one of his antagonist's sticks and lays it to his own; and he that first gets all the sticks from the other in that manner is said to win the game, which is generally for a single load of powder and shot, an arrow, or some other thing of inconsiderable value. [Hearne 1795:335]

Smaller stakes are a means of minimizing the selfishness of gambling—that is, the capacity to benefit oneself while harming an opponent—and offer another pathway for gambling to be acceptable at the in-group level.

Prestige gambling

It may be that individuals often competed not for wealth, but for status—a fundamental aspect, Johan Huizinga (1955:63) argued, of play in any form. There are, after all, numerous parallels among Plains societies between war honors and demonstrations of in-group gaming prowess, both of which could be counted as coups (Loy and Hesketh 1995). Flannery and Cooper

(1946) stressed this exact point: not only were high-stakes wagers at the in-group level made exclusively by men, but by rivals within a camp who were competing not for resources, but for prestige. The "enemy friend" relationship Flannery and Cooper (1946:398–99) describe between two members of the same community is complex and involved teasing, mentoring, and mutual protection when at war. It was also between enemy friends—especially unrelated men who had entered into such a compact—that wagers reached their apogee, the outcome familiar from other accounts where "the betting between… two players would result in the loss by one of the last bit of his property…. A comparatively wealthy man could thus become a 'pauper' in a day. Often, too, the relatives of the players would win or lose almost as heavily in backing their respective kinsmen" (Flannery and Cooper 1946:398).

It is of some interest that side bets were wagered along familial lines, a type of cooperation based on kinship ties, but very much more was at risk between the contestants. Describing a hoop-and-arrow game contest between two enemy-friends, Flannery and Cooper (1946:398–99) noted:

> [T]he 'social' stakes were as important as or more important than the property ones…. Two prominent men, enemy friends to each other and at the same time rivals for prestige and status in the tribe, would on a given day play… à outrance. The winner's status and prestige would be greatly exalted; the loser's proportionately lowered. A man's whole career of advancement to prominence in the tribe… could be brought to ruin in a single day's gaming…. He might lose not only his property and so have to begin accumulating again from scratch, but might at the same time lose as well his standing in the tribe and become a defeated and disgraced nobody, of a low standing from which it was very difficult to rise in the scale.

While the concept of the “enemy friend” may be particular to Gros Ventre society, the idea of competitors gaining or losing status is familiar in other forms, for instance among Subarctic Dene hunter-gatherer groups such as the Dane-zaa (Beaver), in what Robin Ridington (1968) termed “medicine fights.” To the Dane-zaa, success in hunting, itself a highly uncertain prospect, is seen as greatly affected by one’s supernatural ability to control events. Because of its scarcity, “[t]he concept of supernatural power, *ma yine*, literally ‘his song’ or ‘his medicine’” is more valued “than the actual physical resources over which it is exercised” (Ridington 1968:1153) and is the ultimate measure of social standing. For young men in particular, the ability to demonstrate power comes through hunting prowess: “In a system of generalized reciprocity (cf. Sahlins 1965) the hunter distributes meat to other members of his residential group, and these gifts lay an obligation on the recipients, who in turn recognize the power of the giver… effect[ing] an exchange of food for status” (Ridington 1968:1153). This sets the stage for medicine duels between individuals jockeying for social standing where “the norm of ‘sharing’ food may be used aggressively as a demonstration of superior supernatural power” (Ridington 1968:1157). This is prestige hunting in the most nuanced sense of the term—a form of costly signaling in which success in hunting transmits information to potential mates, allies, and rivals about abilities, knowledge, leadership, and generosity (K. McGuire and Hildebrandt 2005:698; see also Hawkes 1990, 1991, 1993; Kaplan and Hill 1985). As explained by Kristin Hawkes and Rebecca Bliege Bird, “If men hunt to display their relative quality, then the benefits they earn for that effort come not from exchanges of meat for other goods and services, but from the different ways that others treat them in light of the quality they reveal” (Hawkes and Bliege Bird 2002:61).

Precisely such a demonstration of supernatural power as a status-affirming quality appears in association with gambling. Consider the following "medicine game" recorded in a Kiowa winter count between rival Kiowa and Na'ishandine leaders in 1881–82 (Mooney 1898:348):

> This winter is noted for a great *dó-á* [hand] game played under the auspices of two rival leaders, each of whom claimed to have the most powerful "medicine" for the game.... [T]he Kiowa leader being Pa-tepte "Buffalo-bull-coming-out,"... was recognized distinctively as having "medicine" for this game, and it was said that he could do wonderful things with the "button," making it pass invisible from one hand to another while he held his hands outstretched and far apart, and even to throw it up into the air and cause it to remain there suspended invisibly until he was ready to put out his hand again and catch it; in other words, he was probably an expert sleight-of-hand performer. His Apache rival, Dävéko, is known as a medicine man as well as a chief, and is held in considerable dread, as it is believed that he can kill by shooting invisible darts from a distance into the body of an enemy. On this occasion he had boasted that his medicine was superior for the dó-á game, which did not prove to be the case, however, and as the Kiowa medicine man won the victory for his party, large stakes were wagered on the result and were won by the Kiowa.

Several themes just discussed are reiterated in this account: leaders of distantly related kin groups engaging in a high-stakes gambling contest, the game being a demonstration of superior supernatural power with implications of status rivalry between the contestants, and the gambling stakes being wagered and distributed along kin-group lines. Such contests can be considered prestige gambling, a term proposed here as a parallel to prestige hunting and connoting a form of costly signaling where the enhancement of personal status may be one principal objective. As the exchange of gambling winnings demonstrates, however, the pursuit of direct material gain is both overt and inseparably intertwined. Prestige gambling also has the effect of reinforcing relevant social identities, with in-group cooperation and out-group conflict making clear the socially ordered structure inherent to the continuum of altruistic, mutually beneficial, selfish, and spiteful behaviors that gaming relationships can prohibit or embrace. These behaviors take the form of kin bias—that is, the differential treatment of groups implicitly varying in kinship relatedness (Penn and Frommen 2010:59–60; Sherman and Holmes 1985), however these groups are constructed, recognized, and defined by group members themselves.

Status vs. resources: Decision-making under risk

Discussion of gambling winnings and status gains both overlook one very important point: games are *fun*. Huizinga (1955) went so far as to identify play, and the pursuit of excellence through competition that it encompasses, as a driving force in the development of human culture. Interpersonal competition in all its forms—agonal contests, as Huizinga termed them, from games to poetry duels, potlatches to warfare—can satisfy a basic human drive for the pursuit of status through demonstration of superiority. What is perceived as "fun", though, has a neurobiological basis: gambling stimuli in particular are linked to dopamine release and feelings of reward (Nestler 2005), in some cases leading to pathological behavioral addiction (Potenza 2008); gameplay itself also triggers the brain's mesocorticolimbic "reward" system, especially in men (Hoeft et al. 2008) and has been identified as an addictive behavior (N. Clark 2009). Gaming and gambling are, in other words, in our blood: a neurobiological response signifies an evolutionarily derived mechanism that may help explain the predisposition of human beings to play. Patterns of prestige gambling exemplify this pursuit: not only can status be attained, but material commodities change hands, effectively doubling the reward. Understanding this cycle of motivation and reward—that is, the pleasurable pursuit of status and material gain—is essential to understanding why people play games.

Acquisition of material resources and social status are complementary goals in a developmentally ordered hierarchy of needs: they both enhance prospects for acquiring mates and, by extension, reproductive success (Kenrick et al. 2010). In an evolutionary model of decision-making under risk (i.e., risk-sensitivity theory), individuals are motivated to "engage in risk-taking when needs cannot be met with safe, low-risk behavior" (Mishra 2014:288). Interpersonal competition in the form of gambling and warfare is exactly the type of aggressive, risk-accepting behavior expected of young men who often perceive social access to resources, status, and mates as being unequally concentrated in the hands of others—a phenomenon that Margo Wilson and Martin Daly (1985) referred to as *young male syndrome*. In the case of in-group gaming, the imagined benefits of success may outweigh any concerns about social disapproval or other consequences. As aging individuals meet their resource, status, and mating goals, risk-taking behavior tends to decrease (Mishra and Lalumière 2008); it is expected, then, that out-group competition would be encouraged by older, more established members of the community, deflecting inevitable tensions against members of other groups while still allowing group members to meet their status and resource needs.

If gaming and gambling have the capacity to fulfill basic needs and are pleasurable to the point of being addictive, it is reasonable to question how much effect social norms or controls against selfish in-group behavior could have. Indeed, two sets of values—one promoting social identity and group cooperation, the other seeking personal pleasure and individual fulfillment—seem diametrically opposed. The term “addiction” implies that a behavior has reached the point where it is a problem for the individual or society, and there is some evidence that problem gambling could be a concern for hunter-gather societies. Two contrasting accounts illustrate this point: in a Dakelh story recounted by Adrien-Gabriel Morice (1894:79–81):

> A young man was so fond of playing *atlih* [a stick game] that, after he had lost every part of his wearing apparel, he went so far as to gamble away his very wife and children. Disgusted at his conduct, his fellow villagers turned away from him and migrated to another spot of the forest, taking along all their belongings, and carefully extinguishing the fire of every lodge so that he might perish.

Only when his predilection for gambling affected his family did it earn a strong degree of social opprobrium.

Conversely, in his account of the Piikáni wheel game, David Thompson described an incident where a Piikáni camp had prohibited hunting so as not to drive bison herds farther away: “While we were there… [t]wo tents which had gambled away their things, even to their dried provisions, had to steal a march on the Soldiers [a warrior society composed of recently married men] under the pretense of looking after their horses….” They returned on “the evening of the second day… with their horses loaded with meat which the Soldiers seized… and left nothing to the owners…. Not a murmer [*sic*] was heard; every one said they had acted right” (Thompson 1916:358–59).

It may thus be that attitudes towards gambling are tied to a society’s economic base. In prestige hunting societies such as the Dakelh, where independent hunting success was likely the foundation for status (cf. Ridington 1968), a competent hunter could replace much of his gambling losses with a successful hunt. One's family, however, could not so easily be replaced. A counteracting pressure existed for communal hunters who, while engaging in prestige-based competition, also relied on bison herds to feed large groups: freelance hunting to recoup gambling losses could have deleteriously affected the entire camp, and there are some indications that gambling was more actively policed. According to Thompson (1916:359), the same Soldier society that made sure hunters did not act independently spent much of their time monitoring gambling matches to ensure they did not get out of hand.

Games are potent symbols for intergroup relations that struck a restive balance between peaceful interaction and strife. The necessity of competition for status and resources, especially by young men, may explain sometimes-ambivalent attitudes towards in-group gambling. Social groups could find many ways of mitigating the ensuing risk: by playing for lower stakes, by gambling only against members of rival factions balanced against one's own, and by distributing winnings, where demonstration of personal power (and the concomitant increase in status) was the true object. Nevertheless, the potential for gambling to devolve into hostility that could be detrimental to social cohesion and, in examples from the northwest Plains, the economic realities of communal bison hunting in which large populations were dependent on a resource that was vulnerable to independent action, may both have necessitated that out-group gambling was generally preferred. Coupled with highly desirable rewards that could include both material and status gain, the risk-taking behavior exemplified in stories of intertribal meeting and gaming contribute to understanding the role of gaming and gambling as evolutionarily adaptive behaviors constrained by multiple levels of group identity, and the mediation of conflicting goals and desires.

The Promontory Gaming Inventory

Although gaming materials are commonly reported at sites in the Great Basin and Southwest, Promontory Cave 1 stands out both for the diversity and quantity of materials recovered. Stewart Culin's (1907) anthology of Native American games remains an excellent guide, however, allowing cross-cultural comparisons of gaming traditions. The variability of game forms has implications for how gameplay knowledge was transmitted between groups. Table 6.1 lists the gaming materials from Steward's NHMU collections and our own excavations, together with a summary of similar forms known from ethnographic, historical, and archaeological accounts.

Bone gaming pieces

Steward (1937*a*:25-26, 28) identified nine bone objects likely used as gaming pieces, probably in the hand game, and three more tentatively so. All but two are from Cave 1. Most of these items are more likely bone dice (two varieties), along with what appears to be an ice glider.

The hand game is a team game in which two paired billets, one decorated and one undecorated, are concealed in the hands of one contestant and the captain of the opposing team must guess in which hand holds a specified billet. The hand game was perhaps the most popular and widely known game in western North America (Culin 1907:270–328; Hodge 1907:485), a claim supported by its incorporation into at least one revitalization movement (Kehoe 1996; Lesser 1933). It has remained popular throughout the modern era (Brunton 1974, 1998; Helm and Lurie 1966; Merriam 1955), including in major intertribal gaming tournaments today (Art Calling Last, cited in Yanicki 2014:273–75; CBC News 2014; Shoshone-Bannock Tribes 2014; Tsong 2010).

Table 6.1. Summary of Promontory gaming inventory and similar types from ethnographic, historical, and archaeological records.

Description	Qty.	Source	Similar Forms*	References
Ball				
Juniper bark	1	Cave 1	*Hueco Caves*, *Mesa Verde*, Diné, *southeastern Utah*	Cosgrove 1947:119; Matthews 1889*a*:92; C. Osborne 2004:466–47
Dart				
Wood/feather	1	Cave 1	*Aztec Ruin*, *Mesa Verde*, *San Juan River area*, Paiute, Zuni	Culin 1907:425–28, 495–99; Morris 1919:60, 64; C. Osborne 2004:466; Voth 1903:23, 42
Dice				
Split rib—elongate	7	Cave 1	*Levee*, Hidatsa, Piikáni, Tsuut'ina	Culin 1907:57–58; Fry and Dalley 1979:50; Wissler 1911
Longbone—tabular	2	Caves 1, 2	*Ancient Puebloan*, *Fremont*, *Wilson Butte Cave*	Bryan 2006; Culin 1907:48; Guernsey and Kidder 1921:108; Hall 2008, 2009; Janetski 2017; Weiner 2018
Cane	177	Cave 1	*Daugherty Cave*, *Hogup Cave*, Hopi, *Wilson Butte Cave*	Aikens 1970:170; Culin 1907:160–67, 191, 210–20; Frison 1968:278; Gruhn 1961*a*
Wood	2	Cave 1	*Grand Gulch*, Kiowa, Diné, *Pueblo Bonito,* San Carlos Apache, White Mountain Apache, Zuni	Culin 1907:48–49, 86-96, 124–32; Pepper 1920
Beaver tooth	1	Cave 1	Klallam, Klamath, Kwakwaka'wakw, Kwih-dich-chuh-ahtx, Nisqually, Nlaka'pamux, Nuu-chah-nulth, Nuxalk, Quinault, Secwepemc, Snohomish, Songhees, Tla-o-qui-aht, Tsilhqot'in, Twana	Culin 1907:155–58, 196–98; Lane 1981:402–03
Hoops				
Netted/wood	2	Cave 1	*Franktown Cave*, *Mesa Verde*, Southern Paiute	Culin 1907:498; Gilmore 2005:6; C. Osborne 2004:464–65
Juniper bark-wrapped	11	Cave 1	*Cowboy Cave*, *Hogup Cave*, Hopi, Umatilla	Aikens 1970:121; Culin 1907:493, 495–97; Jennings 1980:72
*Ice glider***				
Bone	1	Cave 2	A'aninin, Apsàalooke, Cheyenne, Hidatsa, *Ice Glider/Middle Missouri sites*, Kiowa, *Lake Midden/Missouri Coteau sites*, Mandan, Sahnish, Sioux (Dakota, Lakota, and Nakota)	Culin 1907:400–01, 413, 415–19; Fenenga 1954; Majewski 1986; Nicholson et al. 2003; Walde 2003
Incised sticks				
Wood	2	Cave 1	*Pueblo Bonito*, Hupa, Diné, Sekani, Zuni	Culin 1907:227, 234, 236; Matthews 1889*b*:2–3; Pepper 1920:35; Weiner 2018:41–43

* Italicized terms denote archaeological collections; noted forms are otherwise from ethnographic and historical observations.

** This item was listed in Yanicki and Ives (2017) as a possible hand game billet, following Steward's (1937*a*:28) interpretation.

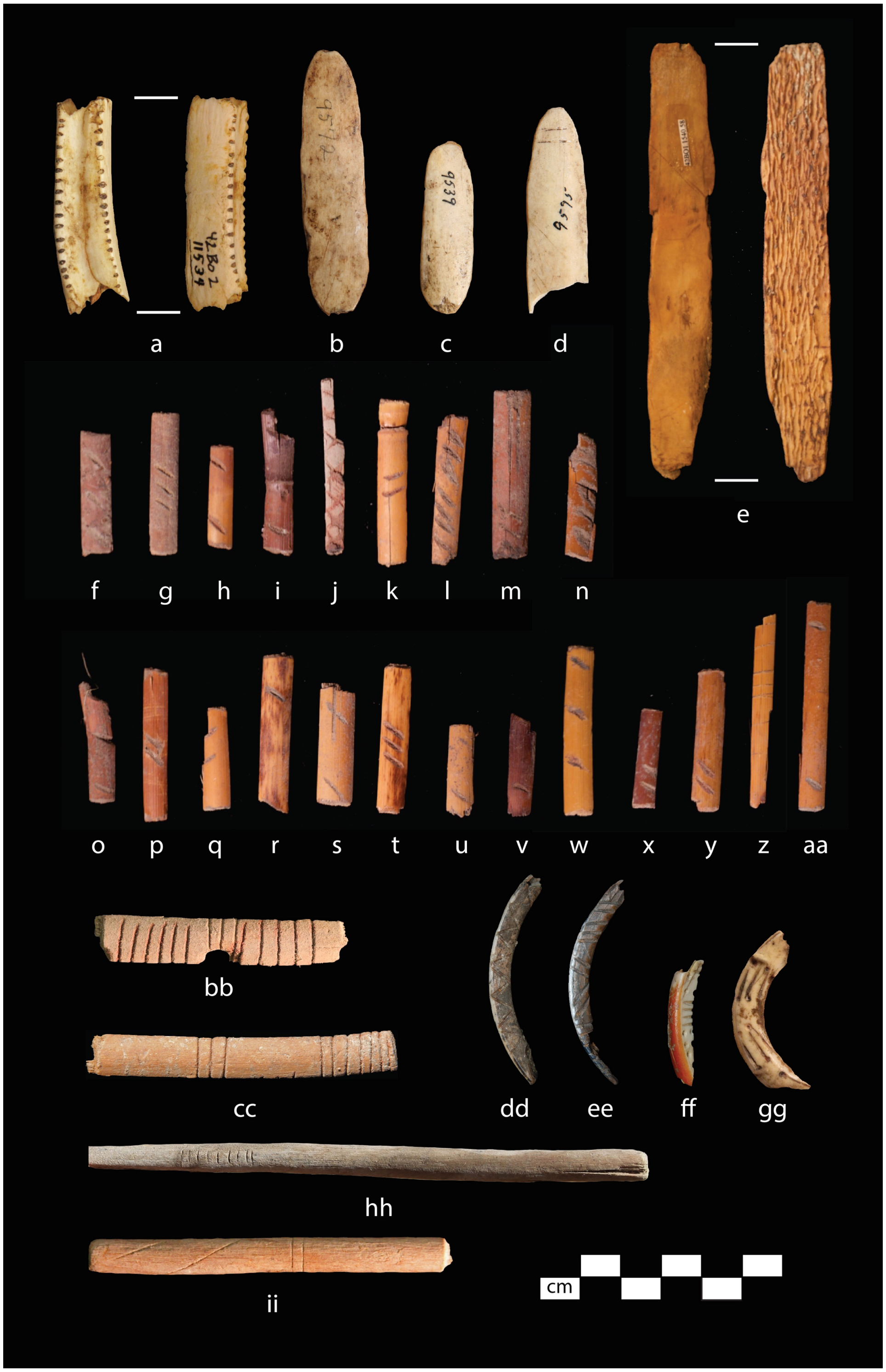

Figure 6.2. Examples of Promontory-affiliated gaming pieces of bone, cane, wood, and tooth likely used in ice glider game (*a*), dice games (*b–gg*), and stick games (*ii–hh*). Items *a–d*, *gg* courtesy Natural History Museum of Utah; *dd–ff* courtesy John Hutchings Museum of Natural History, Lehi (photographed by Lindsay Johansson); all others from 2011–2014 excavations in Cave 1 and 2.

The hand game is sometimes referred to as the "stick game" because of the counting sticks used during scoring (Brunton 1998; Merriam 1955:315); however, this differs from the stick game as termed by Culin (1907:228–66), a game in which an odd numbered set of sticks are themselves the object of players' guessing. In the broadest sense of the hand game, virtually any object can be concealed in the hand, as among the Deh Cho, a Subarctic Dene people, who used "a bit of wood, a button, or any other small thing" (Hearne 1795:335). Culin (1907) also mentions examples of bullets, rocks, strings of beads, and decorated shells (Culin 1907). It may not be possible to say whether such opportunistically available items were used in games. However, across the game's geographic range, the objects hidden in the hand game were often more elaborate, with cylindrical billets of bone, sometimes polished and decorated with a painted band or wrapping extending around the object's circumference, being most common. Such decoration would presumably be necessary so as to be identifiable from any angle when revealed, and to deter cheating during a game that otherwise emphasizes skill in sleight-of-hand. The item attributed by Steward that might come closest to matching the description of a marked hand game billet is a deer rib segment with rows of small blackened notches along three longitudinal margins (42BO2:11534, Figure 6.2, *a*). The piece does not conform with the most common hand game billet style, although notched billets are occasionally described, for instance among the Pawnee, Dakota, and Mesa Grande Kumeyaay (Culin 1907:274, 317, 325).

A number of collections from the Northern Plains are known, however, where similar items are quite common, and were used in a different sort of game. These are known as ice gliders (Fenenga 1954; Majewski 1986; Nicholson et al. 2003; Walde 2003) and fall within the category of

Figure 6.3. The Ice Glider Game, watercolor (John Saul, Yanktonai Sioux), ca. 1930. Collection of the Center for Western Studies, Augustana College, Sioux Falls (Brokenleg and Hoover 1993 : plate VII). Note components of ice gliders' typical construction illustrated along top of painting.

distance-throwing games Culin (1907:399–420) referred to as "snow-snake." Ice gliders are usually made from segments of bison or other large mammal rib, cut transversely and gouged out at the proximal end and shaped into a rough point at the distal end. Two sticks were then stuck into the hollowed-out end, and feathers were tied onto the ends of the sticks, creating an implement about a foot in length that was launched down a prepared snow or ice track (Figure 6.3). Decoration of ice gliders varies across ethnic groups (Warren 1986), but in the largest known collection of such pieces, from the Lake Midden site, Saskatchewan, 46 of 280 specimens have rows of notches on one or more margins, probably as markers of their owners' identities (Walde 1993:58).

More conclusively supporting the identification of this specimen as an ice glider (or truncated fragment thereof), the ends of two sticks are firmly stuck in the piece's hollowed-out proximal end (Figure 6.4). The piece is considerably out of range, however, both spatially and temporally: ice gliders are generally known only from an area on the Middle Missouri River of North and South Dakota and Montana and from adjacent parts of the Missouri Coteau in southern Saskatchewan and Manitoba, while the oldest known specimens date to ca. AD 1450 (Nicholson et al. 2003). Another notched specimen has been noted in a private collection from west of the Great Falls of the Missouri (Joel Janetski, personal communication, 2018). The Promontory specimen is from an uncertain context in Cave 2 and is not yet dated; the significance of the association with a Northern Plains gaming style is only beginning to be explored (Yanicki, in prep.).

Figure 6.4. Proximal end of notched bone object 42BO2:11534. Previously identified as a hand game billet (Steward 1937*a* :28 ; Yanicki and Ives 2017 :147), the two sticks stuck firmly in the hollowed-out area suggest this piece is instead part of an ice glider.

Nine other bone objects (Figures 6.2, *b*–*d*, 6.5), including seven identified by Steward (1937*a*:25–26) as possible hand game billets, are for the most part made from split rib segments and fit in a class of what are frequently termed "gaming pieces" or "gambling sticks" in the Fremont area (Gunnerson 1969*a*; Judd 1926; Talbot et al. 2000; Wormington 1955). While

Figure 6.5. Bone dice from Cave 1 excavated by Steward; dorsal (left) and ventral (right) views. Top to bottom, left to right: 42BO1 10396, 9572, 10371, 9573, 9542, 10435, 9575 (or 9595), and 9539. Photos taken courtesy Natural History Museum of Utah. Note cancellous bone on underside of all except 9573 and 42BO2:11536-1(not pictured ; Steward 1937*a* :figure 8, *g*).

Steward's attribution is at least somewhat plausible, as flattened oval hand game billets are known, including among the Piikáni on the northwest Plains (Culin 1907:271), most of these items can more readily be recognized as dice: two-sided objects with one convex, often decorated face and one flat, undecorated face.

Bone dice fashioned from cut, polished, and often decorated longbone segments are ubiquitous throughout the Fremont culture area; these are often perforated with a central hole (Hall 2008, 2009; Janetski 2017). Like Fremont bone dice, two of the Promontory specimens (42BO1:9575 and 10396) are decorated on the convex, cortical face, one with several clusters of shallowly incised, ochre-stained transverse lines, and the other with two incised lines at one end. However, most bone dice from the Promontory Caves differ from the usual Fremont pattern in several ways. They are large, irregularly oval rather than rectangular in shape, and little care seems to have been put into their manufacture beyond some smoothing and shaping of the margins.

Oval dice with incised, ochre-stained decorations are known from some Fremont contexts including the Provo Mounds (42UT2; Figure 6.6), from Ancient Puebloan collections (Culin 1907:48; Guernsey and Kidder 1921:108), and from ethnographic collections, including from the Kiowa (Smithsonian National Museum of Natural History, E152911; Culin 1907:160; Merrill et al. 1997). However, instead of having a smoothed, flat or incurving interior face and being made from tabular longbone segments, the Promontory dice usually exhibit cancellous bone tissue on their interior faces and are made from split ribs. The exceptions are 42BO1:9542 (Figure 6.5, upper right) and 42BO2:11536-1 (Steward 1937*a*:figure 8, *g*), which reflect the Fremont pattern.

Figure 6.6. Roughly oval bone dice from Provo Mound 2. Top to bottom, 42UT2 11425.1, 11425.2, and 11425.3. Specimens are characteristic of the Fremont area, made from cut and polished longbone segments with no cancellous tissue remaining on ventral surface. Photo taken courtesy Natural History Museum of Utah.

The predominant combination of attributes seen in the Promontory assemblage is not unique in the Great Salt Lake area. The late component of the Levee site has bone dice that appear to cross over between the classic Fremont style and the Promontory style. Five complete and two partial bone "gaming counters" were found there (Fry and Dalley 1979:50, 54, fig. 37, f–h). Like the Fremont dice, the Levee site specimens are generally rectangular, but like the Promontory Cave 1 specimens, all are fashioned from split mammal ribs with the cancellous underside left unmodified. Other features are also strikingly similar to the specimens from the

Figure 6.7. Tsuut'ina bone dice (dorsal and ventral views) with bundled counting sticks. Canadian Museum of History V-D-281 a–p.

caves: "One specimen has several rough transverse scratches at the center of artifact. Another [more oval than rectangular] has two equally spaced transverse grooves with traces of ochre in them; a third fragment, badly weathered, shows similar grooves and a trace of red ochre."

A fairly spectacular analogue for the Promontory bone dice can be found in the collections of the Canadian Museum of History (Figure 6.7). This set of four dice, collected from the Tsuut'ina in southern Alberta sometime before 1921, features long, bipointed ovals made from split bison ribs and decorated with diagonal- and parallel-incised lines that are coloured red and, on two dice, blue. The two dice with sets of three parallel-incised lines at either end and across the middle are particularly similar to the decorated Promontory examples. The Tsuut'ina dice are large (approx. 15 cm), but like the Promontory dice, their reverse faces consist of cancellous bone mass.

Four additional specimens, including three considered by Steward as possible gaming pieces, are excluded here. These are elongate (9–10 cm) and curve slightly upward in longitudinal profile (42BO1:10410, 10590, and 10636 [not pictured] and 1540.58, Figure 6.2, *e*). Similar in length to some Plains bone dice (Culin 1907:57–58, 84, 186; Wissler 1911), they lack a bipointed or oval shape and usually only have one intact end, which bears polished striations. They are probably not part of the Promontory gaming assemblage: Steward (1937*a*:26, 28) noted they could also have had scraping or cutting functions. Similar artifacts from sites on the Plains have sometimes been reported as bone "spatulas" (Lehmer 1971:88); porcupine quill-flattening is the most commonly suggested use for them, although other functions such as pottery smoothing have also been proposed (Neuman 1960:101–02; Orchard 1916:9; cf. Wedel 1955; Wheeler 1956). Flattened quills are abundant in the caves, separately and as vamp decorations on moccasins.

Cane dice

Split segments of cane (*Phragmites australis*), cut lengthwise in half and squared at the end, decorated with irregular numbers of diagonally or laterally incised grooves on their curved exterior faces, were identified by Steward (1937*a*:23-24) as dice, based on numerous ethnographic examples (Culin 1907:160-65, 167, 191, 210-20). Since 2011, we have recovered 151 more from all parts of Cave 1, 83 from a controlled 1 m x 2 m excavation area (Figure 6.2, *f–aa*). Most of the dice (n = 43) were concentrated in the upper ~50 cm of deposits, corresponding with the latest stages of occupation; the remainder (n = 40) were found in the next ~170 cm of deposits, occurring in clusters of one, two, or three in nearly every strata down to the earliest stages of the Promontory period of occupation. If the observed density in the 2 m^2 excavation area is reflected in the remaining unexcavated, livable portions of the cave (dozens of cubic meters of deposit), then even a conservative estimate would put the total number of cane dice in Cave 1 well into the thousands (Hallson 2017, in prep.).

No other archaeological site matches the frequency with which cane dice are observed in Cave 1. A single cane die, 2.2 cm in length and "scribed with thin transverse lines and lines of dots" was collected from Hogup Cave (Aikens 1970:170, figure 121, *j*); this decoration pattern differs somewhat from the majority of the Promontory specimens. Three small cane dice were found at Daugherty Cave, in the Big Horn Basin of north-central Wyoming (Frison 1968:278, figure 7). At Wilson Butte Cave, on the Snake River Plain in Idaho, a single cane die was found with pyrographically incised diagonal lines (Gruhn 1961*a*:96); the diagonal orientation matches most Promontory cane dice, although blackening along the edges of lines is infrequent on the Promontory dice, suggesting that a heated implement was only occasionally used. The specimens reported by Steward were all less than 7.5 cm in length, many less than 2.5 cm; the cane dice we recovered, as well as those from Hogup, Wilson Butte, and Daugherty caves, fall in this size range.

Culin (1907) described several cane dice games. Dice collected from the Paiute in southern Utah measure from between about 15 cm and 35.5 cm in length (Culin 1907:166-67, figures 204–05). Zuni cane dice, meanwhile, are also long, typically 15 cm or more, decorated with lines and rows of dots that are cut, scratched, or marked with ink. Another feature of illustrated Zuni cane dice is that one end of each die is always a constricted joint segment of the stalk (Culin 1907:210–20), a feature that appears somewhat indiscriminately in the Promontory specimens. Hopi dice are small, 7.5–10 cm, and include both diagonally incised lines exactly as seen at Cave 1 (Culin 1907:162, figure 195) and rows of dots as at Hogup Cave (Culin 1907:160, figure 190). In both cases, Culin noted that the decorations were burned rather than incised.

Cane dice are used in sets: east of the Mississippi, eight dice were used; on the Plains and Far West, four; in the Southwest, three. Decoration on each die often varied within sets (DeBoer 2001:223). Only a single die lacks any incised decoration in the Promontory collection, while two are cross-hatched (e.g., Figure 6.2, *j*). The remainder have between one and 11 parallel incised lines, with two being the mode (n = 56) and three the next most common (n = 36; see Table 6.2). Combinations of one paired pattern and two singletons, such as in the split cane dice game of the Lemhi Shoshoni, yield more distinct combinations than sets of eight identical dice, which DeBoer (2001:223) suggested can help "maintain an interesting level of scoring complexity." The overrepresentation of dice with two or three incised lines in the Promontory assemblage suggests that some combination of paired and singleton dice may have been in play.

Table 6.2. Frequency of incised marks on Promontory cane dice.

No. of Lines	Count
0	1
1	17
2	56
3	36
4	19
5	9
6	3
7	3
8	2
9	1
10	1
11	1
Cross-hatched	2

While the Promontory dice are decidedly similar to some Hopi dice, the Hopi cane dice game Culin (1907) described is recognizable as a variant of patolli or quince (see DeBoer 2001:223–24; Evans 2017; Walden and Voorhies 2017) in which dice throws determine the advancement of tokens on a playing board. No playing board like the incised stone slabs of the Hopi variant has been found in the caves, but game boards could also be painted on buffalo robes, as in Zuni and Kiowa versions, and rings of small stones were used to keep score in White Mountain and Chiricahua Apache, Keres, and Zuni variants (Culin 1907; Seymour 2017). In Plains variants, dice were commonly tossed in a basket (Jolie 2006), while Diné accounts describe bouncing them against a flat stone (Matthews 1889*a*:91; Wetherill 1997:157). As DeBoer (2001) has noted, dice games across North America were most commonly a women's game, although the Hopi and Zuni variants are rare examples of those played by men.

Stick dice

Two split stick dice also were found in the recent excavations (Figure 6.2, *bb–cc*), both of box elder (*Acer negundo*) or Rocky Mountain maple (*Acer glabrum*) (Puseman 2014). One of them is ochre stained and split in half with what appears to be a centrally drilled hole, evocative of the hole in many Fremont bone dice. Parallel-incised lines run transversely across the exterior surfaces of each.

Culin suggested that stick and cane dice were interchangeable: a set of four split-stick dice was found with a set of nine cane dice together with wooden cups at Grand Gulch, Utah; a third set from this locale includes both cane and stick dice that "appear to be copies of canes" (Culin 1907:48–49). Among the Zuni, Culin remarked: "Many of the wooden dice, which the Zuñi call 'wood canes,' bear an incised mark on the inner side, corresponding to the inner concave side of the canes." In addition to cane or stick dice being preferred among modern Puebloan groups, small, similarly decorated dice made of split sticks have been reported among numerous other peoples, including southern Dene groups (see Table 6.1).

Beaver-tooth die

A solitary beaver tooth recovered by Steward (1937*a*:26; Figure 6.2, *gg*), decorated on one side and "wrapped with sinew as if for suspension as a pendant" (this wrapping has since been lost), is identical to beaver tooth dice used by peoples of the British Columbia Plateau, the lower Columbia River, and Northwest Coast (Culin 1907:155-58, 196-98; Lane 1981:402-03). In addition to beaver, similar dice are made from muskrat, porcupine, and woodchuck teeth (Castile 1985:210; Culin 1907:137–38; Gatschet 1890:80–81; Howe 1968:60). Used in sets of four (the upper and lower incisors), they were typically dropped against a hard object such as a grinding stone (Klamath, in Culin 1907:137–38; Dorsey 1901:26; Gatschet 1890:81) or onto a robe or blanket (Nlaka'pamux, in Teit 1900:272).

The decoration on the Promontory beaver-tooth die is unusual, consisting of elongated teardrop shapes; more commonly, "[o]ne pair of dice… bore punctate circles, a design executed with a bipointed stone engraver used in a compass fashion, while the second pair of the foursome was marked with incised chevrons or diamonds" (DeBoer 2001:225). This patterning bore significance: circles and chevrons were, respectively, patterns often associated with women and men (Spier and Sapir 1930:267; cf. D. Osborne 1957:170–72), while the paired larger upper and smaller lower incisors were themselves also distinguished as "male" and "female" by the Klamath

(Gatschet 1890:81). Although the solitary Promontory die is insufficient to demonstrate this opposition, DeBoer (2001:225) noted a variant in which three "female" circle-patterned dice were used with a single "male" sinew-wrapped die (Gunther 1927:276; cf. Eells 1877:90; M. Smith 1940:217–18; Teit 1900:272); here we see a very clear referent for the wrapping on the Promontory specimen, which was not, as Steward suspected, tied for use as a pendant. "Maleness" of the die does not relate to men playing the beaver-tooth dice game; the sources examined by Culin (1907) and DeBoer (2001) are consistent in its being played exclusively by women.

While beaver-tooth dice are not known from excavated Fremont sites, the Hutchings Museum of Natural and Cultural History in Lehi, Utah contains five very similar objects made of porcupine and beaver teeth (Lindsay Johansson, personal communication 2012; Figure 6.2, *dd–ff*). These specimens, donated in 1956, are of unknown provenance, but the area surrounding Utah Lake hosts several Promontory-affiliated sites dating to the 14th and 15th centuries AD (Janetski and Smith 2007). These dice may represent a previously undescribed artifact class diagnostic of Promontory Phase occupation.

Stick game

Two cylindrical, decorated sticks found in Cave 1 may have been used in the stick game, another common guessing game in which contestants either tried to guess which of two bundles contained an odd number of sticks, or which bundle contained a specially marked stick (Culin 1907:227). One stick is 13 cm long (Figure 6.2, *hh*) and features a number of short parallel notches midway down its length, a pattern that could easily be concealed when the stick was grasped, together with others, in the hand. Similar specimens are known from the Sekani (Culin 1907:236), a northern Dene people, and the Hupa (Culin 1907:234), a Pacific Coast Dene group from northern California. This could also be a tallying stick, a common aspect of many gambling games (see Janetski 2017). While harder to distinguish individually, two notched stick-like counters did appear in the bundles used to keep score in the Diné moccasin game (Matthews 1889*b*:2–3).

The other specimen (Figure 6.2, *ii*) features two incised parallel lines around its circumference and a single line spiraling around one end. This decoration appears in Northwest Coast and Subarctic stick game specimens (Figure 6.8), played by obscuring a number of decorated sticks within shredded cedar bark, with the opponent striving to find the specially marked trump stick. Shredded juniper bark is of course abundant in Cave 1. The piece may also be a decorated hand game billet; incised bands around the center of the shaft are a very common motif, and the spiral decoration at the end is a very close match for some Klamath pieces (Culin 1907:292; Dorsey 1901:22; note, however, that those pieces are bone).

Figure 6.8. Subarctic and Northwest Coast gambling sticks and pouches. Left, Tahltan, ca. 1904 (National Museum of Natural History no. E230019). Middle, Tahltan or Haida, ca. 1865–1900 (McCord Museum of Canadian History no. M4201.0-23). Right, Haida, ca. 1884 (National Museum of Natural History no. E073552).

Large numbers of cylindrical wooden sticks have also been recovered in archaeological excavations in Chaco Canyon, and particularly at Pueblo Bonito, where they are the most commonly encountered probable gaming implement (Pepper 1920; Weiner 2018:41). A total of 86 cylindrical sticks have been reported, 68 of them being a long variant, averaging 19.11 cm in length and 1.34 cm in diameter, and 18 of them being shorter (no dimensions reported; Weiner 2018:41–43). Of these specimens, 57 long cylinders and 17 short cylinders were found during excavation of a single room (Room 2) at Pueblo Bonito alongside 26 sticks of a different form (i.e., split) that the Diné workers who found them explained "the Pueblo people formerly used… in the same manner as the bone dice" (Pepper 1920:35–36).

Interpretations of the purpose of these cylindrical sticks has varied. George Pepper (1920:35) described them as "game sticks" but noted the cylinders could not have served in a dice game. Robert Weiner (2018:42–43) has noted the similarity between the larger sticks and the billets kicked like a ball in the Zuni ceremonial kick-stick game (Culin 1907:682–83; not to be confused with the "kick stick" used as a scoring counter in some versions of the hand game, see Art Calling Last, cited in Yanicki 2014:274). The longer and smaller cylinders are then tentatively identified by Weiner (2018:41) as kick sticks, hand game counters, and hand game pieces. Of considerable interest here, many of the Pueblo Bonito wood cylinders, as well as many Zuni kick sticks, feature incised spiral decoration running from one end (Weiner 2018:42). In addition to this similar markings, the shorter of the two Promontory specimens may also fall in the same size range as the shorter Chaco cylinders, which are too short to merit consideration as being used in a kicking game; use in some form of guessing game remains a likely option.

Figure 6.9. Sinew-netted hoop and feathered dart (*a*), juniper bark-wrapped hoop (*b*), juniper bark ball (*c*), and typical Promontory-style moccasin (*d*). Photographs by John W. Ives; items *a–c* courtesy Natural History Museum of Utah.

Netted/wood hoops

A bent sapling hoop, 15 cm in diameter and tied with the remains of a mesh of sinew netting, was likely used in a hoop-and-arrow game (Culin 1907:441-48, 498; Steward 1937*a*:24, plate 6; Figure 6.9, *a*). The object is unique in relation to other archaeological sites in the Great Salt Lake Area, though netted hoops of this type are distributed through much of the Plains (Yanicki 2014, figure 2.6). Steward (1937*a*:24) noted a similarity between the Promontory specimen and those used in the ethnographically observed Southern Paiute version of the hoop-and-pole game (Culin 1907:498, figure 653).

One other prehistoric netted gaming hoop is known from Franktown Cave, on the eastern slopes of the Rocky Mountains in Douglas County, Colorado (Gilmore 2005). Franktown Cave is of interest for a number of reasons, including the presence of a Promontory-style moccasin (Ives 2014; Ives et al. 2014) and Dismal River Grayware, a ceramic style from eastern Colorado and elsewhere on the Central Plains with a noted similarity to Promontory Ware (Aikens 1966; Gilmore and Larmore 2012; Gunnerson 1956, 1960; Hill and Metcalf 1942; Wedel 1959:597). The Franktown hoop, remarkably similar in appearance to the Promontory specimen except for its smaller size (it is only 9 cm in diameter) has been dated to 798 ± 30 BP (1186–1276 cal. yr. AD; Gilmore 2005:6, figure 19). This approaches contemporaneity with the Promontory hoop, which dates to 733 ± 24 BP (1247–1294 cal. yr. AD; OxA-23882). Two-thirds of a second wood hoop were recovered from Cave 1 in 2014; sinew ties the two ends of the hoop closed just as on the netted specimen. Similar lashed twig hoops have been recovered from numerous Southwestern sites including Mesa Verde (C. Osborne 2004:464–65); simple hoops of various diameters are ubiquitous in Culin's (1907) collected accounts of the hoop-and-pole game. These also often form the inner core of more complex bark- or other fiber-wrapped gaming hoops.

Bark-wrapped hoops

Also found in Cave 1 were "a number of small rings of juniper bark from *Juniperus utahensis*…which closely resemble the rings commonly used throughout puebloan cultures of the Southwest as pot rests. They vary from 2½" [6.5 cm] to 4¼" in [11 cm] outside diameter, and are bound generally with juniper bark but occasionally with cord" (Steward 1937*a*:20; Figure 6.9, *b*). A total of 11 such specimens have now been recovered. Similar hoops are known from archaeological contexts in the broader region; these are typically wrapped bark or reed rings, such as occur at Hogup Cave (Aikens 1970:121, figure 122). Six specimens, 3 cm to 11 cm in diameter, were also found at Cowboy Cave in southeast Utah (Jennings 1980:72).

Fiber-wrapped rings have sometimes been interpreted as hoops for the hoop-and-dart game (Gruhn 1961*a*:96; Jennings 1980:72) based on comparison to ethnological collections: Culin described a larger (28 cm diameter) bark-wrapped stick hoop from the Umatilla of Oregon and a number of similarly wrapped corn husk rings from the Hopi, ranging in diameter from 6–18 cm (Culin 1907:493, 495-97, figures 643, 648, 650, 651). At the smaller end of this scale, these match some of the Promontory and Cowboy Cave specimens; the archaeologically recovered hoops are otherwise far smaller than any that Culin described. Steward (1937*a*) was of the opinion that these were pot rests; later in his career, though, he would note bark-wrapped gaming hoops among the Dakelh of northern British Columbia (Taylor and Sturtevant 1991:194–95). Head-rings, used to stabilize loads when carrying them on the head, are also known from Ancestral Puebloan sites such as Mesa Verde: Carolyn Osborne (2004:302, 354–56, 465) noted that jar rests, used to stabilize heavy pots after removing them from a fire, are typically asymmetrically flattened on one side and bear sooty residue on the opposite side, while head-rings are asymmetrically constructed. None of the Promontory hoops display sooty residue or exhibit asymmetry, and therefore appear consistent with gaming rings.

Feathered darts

An unspecified number of feathered darts found by Steward in Cave 1 (Steward 1937*a*:24, plate 6) were likely used in the hoop-and-pole game. One such dart in the NHMU collections (Figure 6.9, *a*) is 17.9 cm long; half its length consists of a blunt-nosed greasewood (*Sarcobatus* spp.) stick, roughly lashed at one end with sinew to a feather of equal length.

Though a wide variety of projectiles are reported in variants of the hoop-and-dart game, stick-and-feather darts have a specific distribution. Very similar examples consisting of "pins of hard wood about 4 inches in length, to which single feathers, twisted somewhat spirally, are bound with fiber" are illustrated by Culin (1907:498–99) from the Paiute. The others come from the Puebloan area, where darts constructed by tying one or more feathers to the end of a pointed stick, sometimes thrust in turn through a corn cob, were used in a Hopi ceremonial game with a corn husk-wrapped hoop and were included in Zuni War God offerings together with a netted hoop (Culin 1907:425–28, 495–97; Voth 1903:23, 42). Stick-and-feather and stick-and-corncob specimens are also known from archaeological collections from a number of Ancestral Puebloan sites (Culin 1907:428; Morris 1919:60, 64; C. Osborne 2004:466).

Juniper bark ball

A juniper bark ball, 3.1 cm in diameter, was found by Steward in Promontory Cave 3 (1937*a*:21, 41; Figure 6.9, *c*). Similar balls made of yucca fiber are known from Mesa Verde, southeastern Utah (C. Osborne 2004:466–67), and the Hueco Caves (Cosgrove 1947:119, figure 112).

While the purpose of such balls would undoubtedly be for play, their precise function is unclear; balls could figure in a large number of games (Culin 1907). Matthews (1889*a*:92) described a Diné game to see who could kick a ball beyond a marked distance. A ball is also one of the objects that could be used in the moccasin game, in which an object was concealed from an opposing team within one of several moccasins. While the moccasin game is known among Algonquian, Siouan, and Apachean speakers (Culin 1907), the Apachean accounts stand out from those of other societies: in no other case of which we are aware is the oral tradition motif so strongly cast, with a consistent theme. In Diné as well as Jicarilla, Chiricahua, and Western Apache accounts, for instance, the moccasin game arose as a contest between creatures vying to see whether night or day would prevail (Culin 1907:335-48; Goodwin 1994:148-50; Matthews 1889*b*; Opler 1942:23-27). A game that seesawed back and forth through the night goes unresolved, leaving the world with both night and day. The moccasin game must not be played in daylight, and should a game run late into the dawn, special precautions must be taken to darken the lodge in which players remain. Matthews wrote that there were literally hundreds of moccasin game songs known to experienced participants. In these respects, the Apachean versions of the moccasin game were strongly integrated in a broader social context that seems to go beyond that of many other societies.

Neither Steward's nor our excavations yielded aligned, partially buried moccasins as would be characteristic of this game. Despite this, the raw materials for this game, discarded moccasins, were certainly in abundant supply. As with ceramics, northern Dene peoples do not play the moccasin version of the hiding game: somewhere during their southward sojourn, proto-Apachean ancestors shared in developing rich oral traditions surrounding it.

Discussion

To the list of culture traits that define the Promontory people (i.e., Janetski 1994; Steward 1937*a*), it should be added that they loved to play games—the Promontory gaming inventory is both abundant and diverse. It is important to remember, however, that gaming was, and is, more than mere recreation. Stewart Culin's work showed that the games of Native American peoples were inextricably linked to ceremonial and social life, figuring in everything from origin stories to healing magic and augury. These games were also almost universally gambled upon (DeBoer 2001; Flannery and Cooper 1946; Gabriel 1996) and hence served as a mechanism in prehistoric trade (DeBoer 2001; Janetski 2002). People's choice of gambling partners was, in many ways, constrained. While amicable in-group contests for relatively low stakes and prestige were common, out-group, exogenous gambling affines—typically at the intertribal level—were preferred in gambling for higher stakes where wagers included not just everything one owned, but one's family or self as debt slaves.

A fluency in games

If people were gambling at the intergroup level, a number of corollary observations are expected. Games represent a social interaction that had to be mutually intelligible; that is, the rules by which the games were played and trade was conducted had to be understood by both parties. Archaeological evidence of gaming can be conceived of, then, as a surrogate for language—one can achieve a sense of who was able to communicate with whom through a shared fluency in games. The geographic distributions of games will show clusters of commonalities, reflecting populations that participated in shared gaming traditions as they learned them from each other. Molly Hall

(2008) noted that differences in the decoration of Fremont bone dice can be seen at sub-regional levels, suggesting highly localized networks of trade and intersocietal contact. Other clusters can be seen on larger scales, for instance with the distribution of different styles of dice games (DeBoer 2001:figure 2). Similar regional variants have been noted for the hoop-and-pole game (Yanicki 2014, 2017).

If a similar principle is applied to the gaming material from the Promontory Caves, mapping out ethnographically attested variants of games using similar materials and archaeological sites where similar gaming materials have been found (Figure 6.10), two trends are apparent. First, there is surprisingly little crossover between the gaming inventory of the Promontory people and their Fremont contemporaries. Even at well-preserved Fremont-affiliated sites, items like the split-cane dice that are so abundant at Promontory Cave 1 are absent. Hogup Cave, where a single cane die was found (Aikens 1970:170), is a rare exception, as is Wilson Butte Cave on the Snake River Plain, where a pyrographically incised cane die stands out as highly anomalous in comparison to the more than 100 rectangular bone dice that were found there (Bryan 2006:102–03; Gruhn 2006). The Promontory people did use bone dice, but their manufacture from elongated rib segments is sufficiently different from those found in the core Fremont area to reinforce the apparent difference in how these peoples thought dice should be made and, it can be assumed, how dice games should be played. The presence of split-rib dice at the Levee site (Fry and Dalley 1979) is a notable exception.

Second, the gambling connections of the Promontory people, where affinities in game styles can be identified, extend over a wide geographic range, describing a broad arc with connections to the Plains (elongated bone dice, sinew-netted gaming hoop), the Plateau and

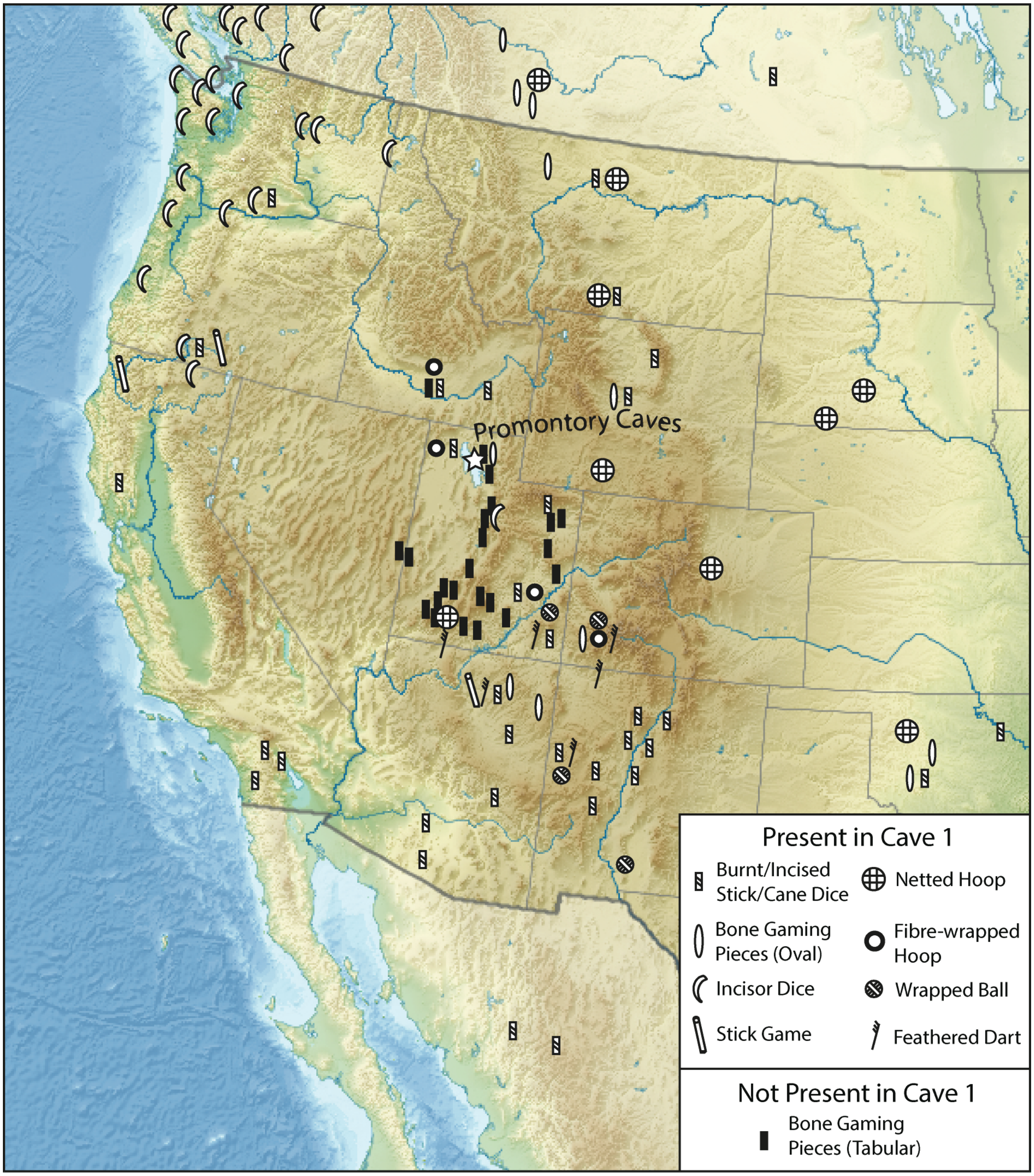

Figure 6.10. Distribution of archaeologically and ethnographically attested games similar to Promontory types (data adapted from BLM 2014, Culin 1907, DeBoer 2001, Hall 2009, and Yanicki 2014).

Northwest Coast (gaming sticks, beaver-tooth die, bark-wrapped hoops), and the Puebloan world (split-cane and split-stick dice, fiber-wrapped hoops, feathered darts, sinew ball). We therefore infer that the Promontory people may have travelled great distances, and at the very least, made social inroads into a sociodemographic network far broader than their Fremont counterparts. While historic and ethnographic observations involve quite different time frames from archaeological specimens, coming after many centuries of significant geopolitical upheaval, we know that some connections, like the netted hoops at Promontory Cave 1 and Franktown Cave in Colorado, are contemporary, as are the differences between Promontory and terminal Fremont games. The Promontory people's reliance on large artiodactyls and communal bison hunting (Arkush 2014; Johansson 2013) may also have required that they be mobile in ways not typical of post-horticulturalist Fremont foragers, making use of a larger geographic range.

Earlier or later stages in the migration of Proto-Apachean peoples may be indicated in the broad geographic distribution of similar games. The striking similarity of the beaver-tooth die from Cave 1 and porcupine-tooth dice from the Hutchings collection, and the presence of Pacific marine shell in the cave record, suggest the Promontory people had some type of social connection far to the west in an area where several Pacific Coast Dene peoples also resided. Hints of the Subarctic origin of the Promontory peoples can be seen in the Promontory assemblage: the same spiral-incised stick that could have been used as a hand game piece also invites comparison to stick games from the northern coast and interior of British Columbia. The stick game of the Tahltan, a Subarctic Dene group, merits consideration here: looking at the incorporation of the term for gaming sticks as root words in the Dakelh (Carrier) language, Morice (1894:79) felt this implied great antiquity to the stick game among the northern Dene. This, the hand game, and bone dice were all familiar to northern Dene peoples such as the Dakelh, Tsilhqot'in, and Sekani (Morice 1894:77–81). Later in his career, Steward worked with the Dakelh of Stuart Lake; photographs of his ethnographic collections include a netted hoop, a bark-wrapped hoop, and a bark-wrapped ball—all familiar from the Promontory assemblage—as well as several other objects that appear in the caves but are uncommon in the Great Basin, including mittens, a toothed bone flesher, and the distinctive BSM 2(Bb) moccasin style (Taylor and Sturtevant 1991:194–95).

"Of Dice and Women" revisited

For all the diversity of the Promontory gaming assemblage, dice are by far the most numerous pieces. Ethnographic and historic accounts show that dice are primarily a women's game—in 106 cases (80.9 percent) across North America examined by DeBoer (2001:table 1), dice games were played by women exclusively. Only rarely were dice games played solely by men (nine cases continent-wide; 6.9 percent), and when both men and women both participated in dice games (16 cases, 12.2 percent), they tended to play separately (DeBoer 2001:224). In his survey of women's gaming, DeBoer did note examples of both men and women gambling as spectators on the outcome of a women's dice game, for instance among the Blackfoot (Ewers 1958:155) and the Yakima (Desmond 1952:26), but in other cases, as with the Crow, women played dice games in seclusion: according to Robert Lowie's informant Grey Bull, "the women always went off by themselves in playing it, and he himself does not understand it though he had lived with Crow women all his life" (Lowie 1956:99).

Lowie's (1956) example from the Crow is noteworthy: the Crow practiced mother-in-law avoidance—that is, the active avoidance of contact with mothers-in-law by sons-in-law. It is small wonder, then, that women gambled in seclusion, or that a male informant could not explain how dice games were played. Mother-in-law avoidance was a widespread practice among Apachean groups (Opler 1937); among the Chiricahua Apache, a man avoided looking at or speaking with his mother-in-law, and formal language exists for conversation between marital affines (Opler 1941). Similar decorum and avoidance applied between male and female siblings in both southern and northern Dene societies (Perry 1991:209–28). Gambling would emphatically not be one of the activities that fit this pattern of circumspect behavior between such relations. In examining the archaeological record of Proto-Apachean peoples at the Promontory Caves, it is entirely reasonable to think that mother-in-law and opposite sex sibling avoidance could have been practiced. While Cave 1 would allow large social gatherings around the large central hearth area, the cave space is indeed divisible, owing to a large rockfall in the center of the cave. In keeping with expectations should avoidance practices have been in effect, cane dice are ubiquitous both at the front of the cave, including in Steward's excavations and our own from 2011–2014, and at the rear, to the right of the large central rockfall, where even a small expansion in 2013 of an area originally excavated by Steward yielded nine cane dice. Mapping out soundscapes of these and other points in the cave, Courtney Lakevold (2017:133) has shown that sound does not carry between the front and rear of the cave. Noting that the two areas where sound travelled least between contain the most abundant occupation debris, not only is ample room available for men and women to have socialized separately, but people did take advantage of the more private spaces that Cave 1 offered.

The sheer numbers of cane dice present in the caves seem unlikely to have been lost in high-stakes gambling: the very disposability of the gaming material used, and then discarded, suggests the gambling to have been casual in character, and for that reason perhaps more likely to be associated with low-stakes in-group gaming that included women. The variety of dice present is also suggestive in this regard: given that women's access to out-group gambling partners is highly uncertain, the fact that Promontory people were familiar with radically different forms of what is primarily a women's game may indicate not just intersocietal contact, but incorporation of women from different backgrounds into Promontory society itself, the relatedness (or rather, unrelatedness) of whom might have made them very well suited as gambling affines. This carries obvious implications for some of the objects seen in the Promontory caves. Fremont pottery and basketry, for instance, which appear in low frequencies, may have been the product of trade. Yet, the late persistence of the basketry instances we have dated raises the possibility that they were made by women of Fremont heritage living in Cave 1. Variability in the craftsmanship of characteristically Promontory-style artifacts such as moccasins and ceramics may meanwhile represent younger people or newcomers learning new techniques with differing levels of success.

Feasting with mine enemy: The Promontory economy

Gaming activities are of course highly social in character, and it would be an unusual gaming context in which food was not an element we should consider. The subsistence practices of the Promontory Culture are of note in this regard. Steward (1937*a*) referred to the Promontory economy as large game focused, with abundant evidence of bison, elk, antelope and deer. Steward retained only a small qualitative sample of faunal materials from his 1930–1931 work, however. Substantial quantities of bison would have been required to provide for the moccasins, robes and other clothing in the caves. By scaling the volumetric density of recovered artifacts against the extent of the deposits, Reilly (2015) has estimated that between 120-230 bison hides would have been required to account for just the moccasins Cave 1 must have originally held.

A feature from near the base of the Promontory Culture deposits in our exploratory excavation near the mouth of Cave 1 illuminates both Promontory subsistence and its potential connection with gaming. Here we encountered a 20 cm layer of fragmentary bone, 79 percent of which was calcined (and therefore exposed to temperatures in the 650-750 °C range), charred, or scorched, and only 21 percent was unburned (Johansson 2014). This spatially restricted excavation area (no more than 0.5 m^2, though the feature was clearly larger) yielded 6,542 specimens, from which Johansson (2014) calculated an MNI of 25 animals. Bison (36 percent) dominated the identifiable specimens, followed by elk (8 percent), antelope (4 percent), and deer (4 percent). Another 20 percent of the assemblage could be attributed to the large artiodactyl category (possibly elk, but more likely bison).

As Table 6.3 indicates, this feature reflects an "event" at ca. 755-760 ^{14}C yr BP. Debris associated with the burned bone would be consistent with a hearth cleaning episode. We note that Steward described a central Cave 1 hearth that appeared to have been used throughout the late period occupation of the cave. While it is difficult to know the exact impact of Steward's decision to leave most faunal remains behind, a simple "scaling up" of our small test results, which themselves

Table 6.3. AMS radiocarbon ages from the Promontory Cave 1 burned bone feature.

Lab #	Site & Artifact #	Material Dated	$\delta^{13}C$	^{14}C Date	Depth
UCIAMS-143675	42BO1 FS1584, F66 in F3	Bone	-19.8	760 ± 25	-3.03
UCIAMS-143676	42BO1 FS1605, F67 in F3	Bone	-19.2	760 ± 20	-3.14
UCIAMS-143677	42BO1 FS1591, F65	Bone	-19.5	760 ± 20	-2.86
UCIAMS-143678	42BO1 FS1562, F62 in F3	Bone	-20.1	755 ± 20	-2.95

yielded more that 30,300 faunal bone specimens from only a small fraction of the Cave 1 deposits, would suggest that very large quantities of game were procured near the Promontory Caves during this era (see Hallson 2017:81–89 and discussion in Chapter 2).

Because the Promontory Culture population had Subarctic and Plains heritage, there is no question that such a group would know exactly how to extract significant nutritional value from fats and greases in these bones through comminution and boiling strategies. Yet, there is no evidence for intense comminution, while a number of the bones have adhering, charred residues strongly suggesting that fats and greases were accelerants in the fire that consumed the bone. The Promontory Culture inhabitants enjoyed a plentiful large game diet and did not feel obliged to extract all possible food value from frequent kills they made in the cave vicinity.

This seems in marked contrast to the subsistence stresses many believe that terminal Fremont populations had been experiencing for some time with their 12th century abandonment of maize horticulture and subsequent turn to broad spectrum foraging (Benson et al. 2007; Coltrain and Levitt 2002). The unusual characteristics of the Promontory Cave 1 burned bone feature warrant our serious consideration of the idea that feasting may well have accompanied the various gaming activities so well represented in the Cave 1 deposits. Such interactions may have been unusually attractive to terminal Fremont populations: preliminary indications from the excavated portion of the Chournos Springs site suggest that bison remains were absent and what smaller artiodactyls, birds, and lagomorphs were hunted were heavily processed, while charred ricegrass, goosefoot, and amaranth seeds show foraged foods were being consumed that the Promontory Caves' inhabitants, in comparison, seem to have expended no energy on preparing for consumption.

Gambling and Proto-Southern Dene expansion

In addition to the relationship building and prestige enhancement associated with feasting, the commodities that the Promontory people had in abundance could readily have been offered up as stakes in gambling games: historic and ethnographic accounts of gambling frequently describe bettors wagering perishable items including food stores, clothing, and lodgings. The suggestion that commodities of low archaeological visibility, and food in particular, were used as an enticement for the nearby Fremont people at Chournos Springs to gamble offers part of a solution to an otherwise perplexing problem: for all the evidence of gaming activity at the caves, there is little evidence of exotic raw materials, an important means of identifying gambling's role in long-distance, intergroup trade (Hall 2008; Janetski 2002). While some exotic trade goods have been found at Promontory Cave 1—most notably abalone (*Haliotis* spp.) shell ornaments recovered by Steward (1937*a*:41)—they are in very low quantities. Other highly visible trade materials seen elsewhere in the Great Basin such as turquoise and variscite are absent. This would suggest that, despite the Promontory people's penchant for gambling, exotic raw materials were not a significant betting target or, alternately, that gambling partners did not have access to those materials.

A focus on exotic trade goods as evidence for intergroup gambling may be a misapprehension, though. It is instead understood that intergroup exchange in perishables such as food or hides, robes, slaves, or other archaeologically invisible commodities most likely made up the bulk of trade goods (cf. J. Davis 1974; Ford 1983; Hughes and Bennyhoff 1986; Janetski 2002:348; R. Wood 1980). Flannery and Cooper's (1946) account of high-stakes, intergroup gambling emphasizes competition for status and the sundry goods a person owned, not necessarily rare, non-perishable items that might stand out to an archaeologist. The chief requirements for gambling to take place are that gaming partners have stakes of equal value to wager, and for high-stakes gambling, that contestants not be too closely related. If, as seems likely, high quality perishable goods were an enticing trade good offered by the Promontory hunters, the nearby Fremont people of Chournos Springs—potential gaming affines, owing to their geographic proximity and different cultural affiliation—had an invaluable commodity to offer, as well: themselves.

Genetic evidence makes it clear that while the initial Proto-Southern Dene population was itself the result of a small population founder effect, many people were eventually incorporated into Apachean populations in the course of their journey southward. In Northern Dene populations, for example, mtDNA haplogroup A occurs at levels of 80–100%; a specific mtDNA haplotype (A2a) occurs in high frequencies in both Northern and Southern Dene populations (Malhi et al. 2003; Malhi 2012; Achilli et al. 2013). For Diné and Western Apache populations, mtDNA haplogroup A values drop as low as 50–60%, with the balance of the mitochondrial signature being made up of haplogroup B varieties common in Southwestern contexts (Malhi et al. 2003). This genetic finding is consistent with Diné oral traditions in which other groups joined the emerging Diné cultural identity: a number of clan ancestresses were Puebloan women who came from specific Pueblos (Zolbrod 1984; Brugge 1994, 2003, 2006). Monroe et al. (2013) also demonstrated elevated mtDNA haplogroup B and C frequencies in Western Apache populations with Yavapai neighbors. Such interactions played a major role in emergent Apachean societies. We note that mtDNA haplogroup B is the most common genetic signature among eastern Great Basin Fremont burials (Parr et al. 1996). In a scenario where the Promontory people, as an early Proto-Apachean group, were newcomers comprising part of a discontinuous population spread over a considerable geographic area, opportunities for access to affiliated groups, and marriage partners, may have been limited. The remaining option for Promontory people would be recruitment of spouses from other societies, something that could have been socially negotiated through both feasting and high-stakes, out-group gambling that included wagering for human capital.

Stories of men betting their wives and children, and of men and women alike wagering themselves to pay gambling debts are not unusual (Le Jeune 1898:199–201; Matthews 1889*a*:90; Spinden 1908), albeit often for a limited period of time or until a relative could purchase their freedom (for summaries, see Cameron and Johansson 2017; MacLeod 1925). The cycle of Diné creation and migration myths offers a particularly vivid example featuring Nááhwiiłbiihi or Noqoìlpi, 'He-who-wins-men (at play)' (Begay 2004; Matthews 1889*a*:89), also known as the Gambler. In eight versions of the Gambler story examined by Weiner (2018:46–49), seven identify the Gambler's home as Pueblo Alto or Pueblo Bonito in Chaco Canyon. The compulsive appeal of gambling, and social concerns about it, is alluded to in this figure's name, alternately translated as 'The One Who Wins You Over' (Kelley 1997) and 'it would draw you in' or 'it would win you over' (Leroy Nelson, cited in Schwarz 2012:531–532). At issue, suggests Maureen Schwarz (2012:531–532) in a discussion of recent Diné opposition to casino gambling, is a power of persuasion or control, also attributed to descendants of the Gambler with so much as a word, a look, or a touch, to override core values of personal agency and one's ability to uphold consensus seeking behaviour and duties of generalized reciprocity associated with kinship (cf. Ladd 1957:292; Lamphere 1977:42; Leighton and Kluckhohn 1947:107).

The Gambler is variously described as an avaricious Diné man (Ten Broeck 1860:91), as an Ndee man (Bancroft 1886:83), or as a deity who descended upon the Pueblos of Chaco Canyon prior to the Diné's arrival in that area (Matthews 1889*a*). In the latter, highly detailed account, the Gambler wins men's wives and children, then the men themselves, followed by neighboring villagers and entire tribes (see summaries in Cameron and Johansson 2017; Weiner 2018).

Of the four games Matthews (1889*a*) described being played by the hero who eventually liberated the people, three are recognizable from the Promontory Caves: dice, hoop-and-darts, and ball; the fourth involved pushing over a tree, while several more were not treated in detail. While Gambler stories vary in detail, contact between Proto-Southern Dene, Diné ancestors and Ancient Puebloans figures prominently in them, as in Matthews's (1889*a*) account. Predominantly Pueblo-derived clan affiliations for many of the Diné individuals who shared Gambler stories "support the notion that this story has a Puebloan basis" (Weiner 2018:49). Marietta Wetherill, in interviews speaking about her years spent operating a trading post to the Diné at Chaco Canyon after her marriage to Richard Wetherill in 1897, offered a markedly different account of the role of gambling in Diné origins: "The story finally came out: 'There used to be a people that lived north and east that hunted buffalo and they were always fat and they were great raiders. They weren't satisfied with just hunting buffalo, they used to come down into this country and gamble with the Anasazi.' I heard that from a number of different people" (Wetherill 1997:176–77).

Wetherill, who had been adopted into the family of a Diné ceremonialist, spoke both Ndee and Diné, and made many inquiries of an anthropological nature (Gabriel 1997:1–13), had a great interest in this story and inquired about it on several occasions. The buffalo hunters were known as the Blue Cross people because of the decoration on their bucksin moccasins, which they otherwise made "exactly like the Navajos made theirs," but were different from those made by Puebloans. "The Blue Cross people were so successful at gambling, the Anasazi in their desperation traded off their wives and children to pay off their gambling debts. The Anasazi got weaker and poorer until finally they had to merge with other tribes because they could no longer support themselves" (Wetherill 1997:176).

Noting that gene flow, at least of maternally transmitted mtDNA lineages, appears to have been almost entirely unidirectional into Southern Dene societies, Malhi et al. (2003:121) speculated: "Perhaps Southern-Athapaskans acquired wives through warfare or trade, a circumstance that might have been necessary for the survival of a (presumably) small immigrant group." That gambling could have played a role in Proto-Southern Dene ethnogenesis is suggested not just in stories of capture or debtor slavery (of Ancestral Puebloan women and children) but by the possibility of episodes where some diminished Puebloan groups were absorbed by other tribes. Certain Diné clans have ancestral ties to important Ancestral Puebloan sites in the Southwest, including Chaco Canyon, Canyon de Chelly, and Mesa Verde (Brugge 2012; Warburton and Begay 2005:536–37; cf. Walters and Rogers 2000:322–25). Wetherill's story resonated with her for its consistent retelling. The interface between big game hunting, gambling, and the emergence of new social identities equally strikes a chord as a pattern reflected at the Promontory Caves, one which we expect would be repeated elsewhere as Proto-Southern Dene entered the Southwest.

Hinting at this is the appearance of crosses painted with red ochre on the ankle wraps of a pair of buckskin moccasins found by John Wetherill, most probably removed from a burial in Johnson Canyon at Mesa Verde (C. Osborne 2004:75–77, figures 57–58; Figure 6.11). Crosses are

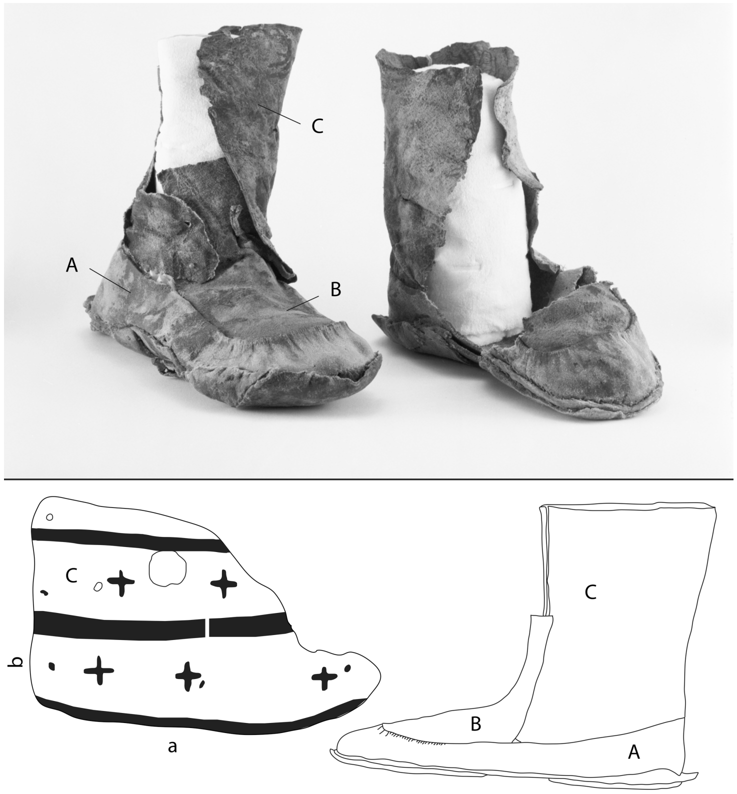

Figure 6.11. Promontory-style moccasins, extensively patched, from Johnson Canyon, Mesa Verde, with drawn detail of red ochre-painted star motif on ankle wrap at lower left (University of Pennsylvania Museum of Archaeology and Anthropology, cat. no. 29-43 705; moccasin details redrawn from C. Osborne 2004, figure 58).

regarded as four-pointed stars in Diné iconography and are consistently found as star ceilings and in sandpaintings of celestial figures (Chamberlain 2004). Osborne (2004:77) recognized the Johnson Canyon moccasins as unusual footwear, drawing comparison to Hatt's (1916:171) illustration of Tahltan and other northern moccasin types. These are immediately recognizable as the BSM 2(Bb) type seen at the Promontory Caves, with an inverted T-seam at the heel, heel tab, ankle wrap, and a round, puckered toe where the front and sides of the sole piece are gathered up and over the top of the foot to attach to the vamp. The individual these were taken from, in a sealed burial chamber with the mummified remains of four others, was described by Wetherill as a "large skeleton… with a bow on one side" (notes cited in Nordenskiöld 1893:46–47); the bow is wrapped with concentric rings, or trusses, of tissue, either gut, esophagus, or heart as reinforcement, and has a thong-wrapped grip (C. Osborne 2004:229–30). Cable-backed bows with such transverse cord wrappings, often with distinctive spirally-wrapped grips, are highly characteristic of Subarctic and Southern Dene groups and have been associated with the Dene expansion into the Southwest (Driver and Massey 1957:355; LeBlanc 1997; Wilson 2011:217–22). This interred hunter offers a tantalizing glimpse at what may be part of a Proto-Southern Dene expansion into the Mesa Verde area.

Summary

The Promontory culture occupation of Cave 1 took place over a brief one or two generation span in the last half of the thirteenth century. This occupation was of such intensity as to result in massive perishable deposits of sufficient scope to suggest the possibility of a near sedentary presence in Cave 1 (to account for the sheer volume of material). The spatial constraints connected with Cave 1 would lead us to believe that a microband-sized group of perhaps 30-50 persons was present. Among a complete range of daily activities, this group focused almost exclusively on large game hunting. Bone refuse accumulated to the extent that feasting must be considered as an activity that probably occurred. Not only were the Promontory Cave occupants well fed: they made high quality leather, had a refined sewing tradition, left clear signs of personal adornment and ceremonial activity, and featured a population dominated by children and subadults that was very likely growing.

The Promontory data fit predictions provided by both Steward and Sapir, namely that a northern-oriented bison hunting population arrived in the caves and then began assimilating southern traits. The population was clearly intrusive, favoring the conclusion that it was Proto-Southern Dene. The presence of late Fremont rock art, rare instances of basketry (such as one-rod-and-bundle) of distinctively Great Basin form (and in this time frame, therefore Fremont character) as well as examples of Fremont pottery (see Chapter 7) all suggest that the Cave 1 population incorporated individuals from—or at least interacted with—terminal Fremont groups. In these respects, the Promontory scenario is consistent with a broad range of modern and aDNA genetic studies indicating that ancestral Southern Dene populations of northern origin must have interacted extensively with southern populations during their southward migration. Gaming activities in Cave 1 may thus have featured interactions between an intrusive, Proto-Southern Dene population and a waning Fremont population, or they may have involved an internally differentiated population in which terminal Fremont population members had joined an emerging Southern Dene society.

While the archaeological assemblages are not quite as rich, the Promontory "pattern" is repeated in Franktown Cave, situated south of Denver, Colorado, on the Palmer Divide (Gilmore 2005, in prep.; Gilmore and Larmore 2012). Franktown has produced a complete child's moccasin identical to the Promontory form (i.e., a BSM 2(Bb) moccasin, with heel tab and ankle wrap), other moccasins fragments, fringed and other clothing fragments, a rim sherd very strongly resembling Promontory pottery, and a small gaming hoop; this part of the Franktown assemblage is contemporaneous with the Promontory Cave 1 and 2 dates described above. The Franktown assemblage occurs in a region through which Ndee ancestors might certainly have passed.

Promontory bison hunters with far reaching social ties thrived in a post-agricultural northeastern Great Basin while relatively settled communities of Great Salt Lake Fremont peoples underwent adaptive shifts from farming to foraging. Both societies likely engaged in relationships that straddled a line between mutual benefit, in the form of feasting and forging of social bonds, and competition in the form of gambling. Fremont and Promontory pottery styles have long hinted at some degree of social interaction, as has the presence of Fremont basketry in the Promontory Caves; genetic data meanwhile continue to shed light on the recruitment of people from the Southwest into Proto-Southern Dene society—especially women, but perhaps also children as well. The abundance and diversity of gaming material at the Promontory Caves, however, offers a glimpse into complex social dynamics that might not otherwise even be imagined: intergroup contests for resources and prestige that speak to a genuine interest on the part of the Promontory people in establishing friendly social relations with their neighbors, principally between women (who appear to have had diverse cultural backgrounds) tempered with competitive intragroup contests in which a person's affiliation could hinge on the outcome of a contest.

After about AD 1300, settlements in the Great Salt Lake area that are variously considered Fremont- or Promontory-affiliated exhibited the trappings of what may have been a polyethnic culture with considerable Proto-Southern Dene influences; changes in this area are almost certainly tied to substantive shifts underway concurrently in the Ancestral Puebloan world. Although highly speculative, it is worth considering that population movements of this era were facilitated by preexisting social connections—a network, for instance, of friendly, and possibly even related groups—the existence of which is suggested by evidence of the Promontory peoples' participation in a far flung, mutually intelligible gaming traditions. It is this social role of games that we return to in closing this discussion. At the Promontory Caves, gaming practices are reflections of, as well as agencies in, migratory processes involving Southern Dene ancestors; there can be little doubt that both Fremont and Promontory peoples saw the benefit to be gained in playing well with others. Looking beyond the Promontory example, the games people played offer a unique perspective on where people were from, whom they met, and how they traversed oftentimes precarious, alien social landscapes.

Chapter 7: Ceramics and Ethnogenesis in the Intermountain West

The specialized bison hunters who inhabited Utah's Promontory Caves in the latter half of the 13th century AD, Julian Steward's (1937*a*) "Promontory Culture," were demographically complex and came from diverse social backgrounds. Hundreds of distinctive moccasins comparable to those made by Subarctic Dene groups were discarded by a thriving population that included men, women, and many children (Billinger and Ives 2015; Ives 2014:153–8). Ubiquitous gaming materials in a diverse range of forms—especially dice, usually seen as a women's gambling game—suggest that women from different social backgrounds were recruited into Promontory society and brought their own distinct traditions with them (Culin 1907; DeBoer 2001; Yanicki and Ives 2017). Some craftswomen in this population may have been of Fremont origin: basketry fragments with stacked rod-and-bundle foundations comprise the latest known examples of a distinctly Fremont production technique (Ed Jolie and Catherine Fowler, personal communication, cited in Yanicki and Ives 2017:141–42).

These indications of intergroup contact and social recruitment provide a useful vantage from which to view the typologically enigmatic ceramics attributed to Steward's Promontory Culture, or in more current terms for the affiliated peoples of the post-Fremont era in the eastern Great Basin, the Promontory Phase (Janetski 1994, in prep.). The very presence of ceramics at the caves merits some thought within the emerging narrative linking the Promontory Phase to migrating bands of Proto-Southern Dene, since progenitor Northern Dene populations originating in the Subarctic most likely did not make pottery (Gordon 2012:327–8; Ives 2003; Warburton and

Begay 2005:552–53; Wedel 1986:136). Genetic studies have already underscored the point that ancestral Southern Dene groups must have heavily recruited women from other populations, possibly at several stages in their history of migration to the Greater Southwest (Malhi 2012; Malhi et al. 2003, etc.). Ceramics, normally an aspect of women's craft production (Rautman 1997:117; Roscoe 1991:203; Senior 2000:72), compel us to consider the many individuals of non-Subarctic Dene origin, especially women, who can be included among modern Diné and Ndee ancestors and who brought knowledge of their own craft traditions with them as they joined early Southern Dene societies.

In this chapter, I present an overview of new ceramic collections from recent excavations at two sites on Promontory Point: Promontory Cave 1 (42BO1) and Chournos Springs (42BO1915), a previously unreported Great Salt Lake Fremont settlement located just 4 km from Caves 1 and 2 (Figure 7.1). A high-resolution chronology and stratigraphic sequence for the Promontory Caves (Ives 2017; Ives et al. 2014; Janetski, in prep.) is now available, together with baseline ceramic data from Chournos Springs for precursor, contemporary, and subsequent occupations. These allow questions of the differences between Promontory and Fremont pottery, and the ways in which Promontory–Fremont contact manifested, to be assessed in greater detail than previously possible.

It has been suggested that ceramics can be of little value in understanding Dene migration since any styles migrating groups possessed would merely reflect the traditions of those they learned from (Gordon 2012:327–8). But this is precisely what makes ceramics so valuable: they can help us identify with some precision the moment when emergent Southern Dene groups began to take on the characteristics of the southern peoples with whom they came in contact and from which later distinctive traditions eventually emerged (e.g., Eiselt 2012; Ferg 2004; Gilmore and

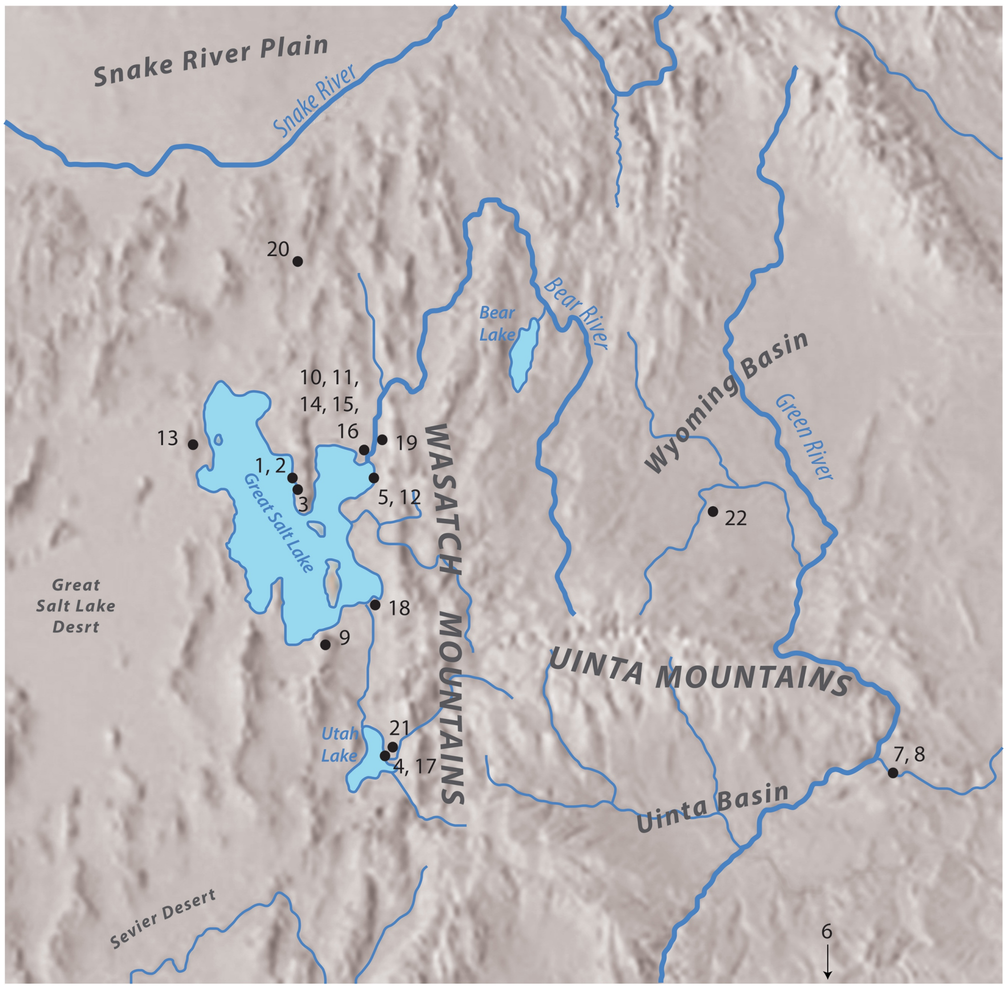

Figure 7.1. Map of principal sites discussed in chapter, in order of first mention. 1) Promontory Cave 1; 2) Promontory Cave 2; 3) Chournos Springs; 4) Provo Mound No. 5; 5) Willard Mound; 6) Turner-Look; 7) Hell's Midden; 8) Marigold's Cave; 9) Black Rock Cave 3; 10) Bear River 1; 11) Bear River 2; 12) Injun Creek; 13) Hogup Cave; 14) Bear River 3; 15) Levee; 16) Knoll; 17) Seamons Mound; 18) Salt Lake Valley sites; 19) Orbit Inn; 20) 10OA275; 21) Smoking Pipe; 22) 48UT199.

Larmore 2012; Trabert et al. 2016, etc.). In other words, they allow us to trace where, when, and perhaps even how these groups became "Apachean." A key to this discussion lies in our ability to understand what preferences a group may have had for avoiding or seeking out intergroup contact, and what predictions these *preferences* allow us to make regarding ensuing patterns of ethnogenetic culture change.

Given that occupation of the caves by Promontory-affiliated peoples in the mid- to late-13th century A.D. is decades or even centuries earlier than previously reported (cf. Aikens 1966; Janetski and Smith 2007; Marwitt 1970; G. Smith 2004; see discussion in Ives et al. 2014), these materials offer insight into the origins of the Promontory ceramic tradition and how it changed over time. The Promontory ceramics are of considerable importance in tracing the movements, emergence, and possibly divergence of Southern Dene ancestors in the Intermountain West. The ceramics may also offer critical insight into the social impacts of their arrival on the many non-Dene groups they came in contact with.

Background: The Promontory Problem

Differences between Promontory and Fremont ceramics are at the crux of what Donald Forsyth (1986) referred to as the "Promontory Problem": ultimately, whether the Promontory phenomenon can be meaningfully distinguished from the variable lifeways attributed to late Fremont groups after the end of maize horticulture in the eastern Great Basin (see also Aikens 1966, 1967*b*; Madsen and Simms 1998). A distinct Promontory pottery tradition was first identified by Julian Steward (1937*a*:42–49) based on his observation of similar characteristics between the ceramics of several cave and open-air sites around the Great Salt Lake and in Utah Valley. A number of typological challenges have since arisen with the identification of what has variously come to be viewed as a variant within the Fremont ceramic tradition (i.e., *Promontory Gray*) or an entirely different tradition from Fremont pottery (i.e., *Promontory ware*).

Steward's Promontory ware

Steward's original ceramic definition, using the term Promontory ware, was derived primarily from the assemblage at Promontory Cave 1, which yielded 649 of the 988 sherds he discussed (others came from a number of cave and open-air sites around the Great Salt Lake and Utah Valley; see Janetski 1994; Janetski and Smith 2007). A typological convention exists of naming artifact variants after the sites where they were first found, which "over the years… become entities in and of themselves, sometimes without much reference to the specific attributes of the 'type' assemblage and its included artifacts" (Knudson 2013:290). If Cave 1 were to be considered the ceramic type site—and I would submit that it should—it is not because it was first observed here, but because here it comprises part of a trifecta, together with distinctive perishable and non-perishable goods and evidence of a particular lifeway, bison-focused big game hunting, that collectively describe the Promontory Culture. Typological drift has most certainly occurred since the type was first defined.

In defining Promontory Ware, Steward highlighted "the general crudeness and blackness of its finish, its coarse white temper, its lack of painted decoration, the use of 'fingernail', incised, and punched decoration on olla exteriors, thickened and decorated lips, and the great preponderance of soot-encrusted olla sherds" (Steward 1937*a*:42). A closer reading is required, however, to evaluate the merits of Steward's view that this pottery is "distinctly different from that found in puebloan [i.e., Fremont] sites around Great Salt Lake" (Steward 1936, 1937*a*:43).

Many attributes Steward described are common to both Promontory pottery and what is now referred to as Fremont ware. For instance, Steward felt some temper to be distinctive, which he erroneously identified as coarsely crushed quartz (actually calcite; cf. Rudy 1953, etc.), but he noted occasional specimens at the caves also possessed mica temper and, especially in the Utah Lake area, dark igneous, crushed quartz, and fine sand tempers were common to both wares (Steward 1937*a*:44, 48–49). In terms of surface treatment, Promontory ware was roughly stick-smoothed with occasional horizontal striations or even burnishing, and "practically all sherds have a black surface as well as paste, and some have a satiny gloss" (though some brown and even light brown sherds were noted; Steward 1937*a*:44). In contrast, his cursory mentions of "glossy, somewhat crackled, brownish gray" ollas and "black-on-gray," interior-slipped painted Fremont bowls can be presumed to have had a finer surface treatment than the "rough finish" he referred to from the caves (Steward 1937*a*:48–9).

Promontory ware, as described by Steward, was quite thin, with body sherds averaging just 4.8 mm. Both Promontory and Fremont ware took the form of ollas and bowls, with Promontory ware possessing regularly curved rims, slight neck restrictions, and mouth diameters almost as wide as vessel bodies themselves, but generally lacking a "flaring-mouth" appearance or handles (Steward 1937*a*:44–5, 48–9). "A few" sherds were from "exceptionally large vessels," as large as 33.0 cm, but other ollas were as small as 10.2 cm; Steward did not provide a mean value for this range. Body decoration was present, but rare: of the 988 sherds that he considered, just 17 exhibited decoration including rows of thumbnail dentates (4 specimens), incised crosshatching (7 specimens), punches or other short incisions (4 specimens), coffee-bean appliqué (1 specimen), and traces of red paint (1 specimen).

Most distinctively, Promontory rims were "*slightly* thickened in practically every sherd" (emphasis added), while among these, the thickest specimens, ranging up to 9.5 and even 12.7 mm, were "distinctly flattened on the top." Additionally, "The rims, whether flat or slightly rounded, are, in the majority of specimens, decorated with either short transverse lines or notches, with a series of crossed lines, or with a row of punches made with the end of a stick or reed" (Steward 1937*a*:46). The trend towards decoration is especially true of Cave 1, where 43 of 67 rims (64.2%) were decorated, but elsewhere such decoration was relatively infrequent or absent altogether (i.e., 6 of 13 rim sherds [46.2%] from Provo Mound No. 5 and 0 of 5 rim sherds from Cave 2).

A final aspect of note in Steward's discussion of Promontory ware is his suspicion that this generally black, sometimes glossy pottery with distinctively thickened and often decorated rims was chronologically sequent, occurring later than the more finely finished and sometimes painted globular ollas and bowls of the pit house dwellers of the Great Salt Lake and Utah Valley shores and beyond. He encountered difficulty in conclusively demonstrating this point, noting that some pottery with Fremont characteristics at otherwise Promontory-affiliated sites might have been transported from nearby pit house mounds; other assemblages, for instance at a mound on Willard Bay near Brigham City, appeared more thoroughly mixed. While he acknowledged that such mixing raised the possibility of contemporaneity of the pottery's makers, he identified only one sherd from Promontory Cave 1 as originating from amongst the neighboring Fremont peoples (Steward 1937*a*:48-49).

Steward also felt Promontory ware was markedly dissimilar to more recent Paiute and Shoshoni pottery: Promontory ware never took the conical, pointed-bottom form of Paiute pottery, nor did Paiute or Shoshoni pottery possess widened lips or decorated rims (Steward 1937:43). In addition to Steward's observations, discontinuity between Promontory ware and the various Brown Ware variants attributed to Numic-speaking groups (see Janetski 1994:164–66) is evident in other differences including the appearance in the latter of flat-bottomed, straight-walled "flower-pot" forms (Butler 1983:14–6; Coale 1963; Frison 1971; Janetski 1994; D. Madsen 1986:211; Rudy 1953; Tuohy 1956).[26] While the dissociation with later pottery is relatively uncontested, the relationship between Promontory and Fremont ware is a greater challenge to assess.

Later analyses

Choosing which of the attributes of Promontory pottery discussed by Steward are most significant for classification purposes has been a long-debated point, especially as regional variations in Fremont ware have come to be identified (Ambler 1966; Marwitt 1970; Rudy 1953; Steward 1936, 1937*a*), among which the Promontory material is sometimes included (as "Promontory Gray;" Aikens 1966, 1967*b*, 1970; Dean 1992; D. Madsen 1979*b*, 1986; R. Madsen 1977; cf. Forsyth 1986; Janetski 1994; Simms et al. 1997; G. Smith 2004). For the sake of brevity, a full review of Fremont ceramics is not offered here; the following discussion focuses on changing definitions of Promontory pottery over time, usually as a relational category held up in comparison to Fremont types.

Much of the morphology Steward had noted for Promontory ware also commonly occurs in many of the principal geographically clustered subareas of Fremont ware (Sevier, Great Salt Lake, etc.). This includes variously smoothed or rough-surfaced bowls and globular ollas with surface finishes ranging from dull to glossy, colors ranging from gray or brown to almost black, virtually all of the body decoration styles Steward described, a range of straight to recurved and wide-mouthed rims, and most of the rim forms except for decoration and thickening, sometimes with flattening. A general consensus has emerged that handles and pitcher vessel forms do not occur with Promontory pottery while they commonly do with Fremont types, and painted black-on-white or black-on-gray decoration is exclusive to certain Fremont variants (D. Madsen 1986:207–08). The history of which attributes are typical of each Fremont subarea and what makes Promontory material distinctive is the history of ceramic typology in the eastern Great Basin.

Jack Rudy was the first to undertake a reanalysis of ceramics in western Utah following an initial typology put forward by Steward (1936, 1937*a*). Rudy (1953:93–4) accepted Steward's designation of Promontory as a ware distinct from earlier Fremont and later Shoshoni wares, but added two significant observations. First, the pottery was tempered with crushed calcite, not crushed quartz, in addition to occasional use of medium quartz sand and mica. Rudy also found that, while Puebloid pottery was universally of coiled construction, the technique employed in the making of Promontory ware was unclear: "[t]he sherds have an undulating surface which has led some to believe it was made by the paddle-and-anvil method" (Rudy 1953:93). This was not unique to Promontory ware, though: Great Salt Lake Gray, first defined by Steward, also possessed undulating surfaces, and with both, interior depressions that should correspond with the positioning of an anvil are not uniform. Rudy felt that surface undulations were more likely a result of hand placement while scraping exterior surfaces, a surface treatment that would have obliterated all evidence of coils should they have been present. It also appears that the "slight" rim thickening noted by Steward became exaggerated in Rudy's work. Taking the extremes of 9 mm and even 12 mm described by Steward, Rudy (1953:93) reported an average rim thickness of 10 mm for Promontory ware that is not suggested by Steward's text or illustrations, several of which show rims *tapering* from the reported average wall thickness of 4.8 mm (Steward 1937*a*:46, figures 16, *a*, *e*, *g*, and *o*, and 17, *h*, *m*, *t*, *x*, *z*, and *a'*).

A lacuna in these early works would prove to have significant bearing on the development of regional ceramic typologies: both Rudy and Steward before him focused on the ceramics of western Utah, delimiting "puebloid" peoples to the eastern Great Basin as opposed to the northern Colorado Plateau of eastern Utah, which was considered a northern continuation of the Puebloan world proper. Aside from brief earlier mentions (R. Lister 1951; "Uintah Gray" in Steward 1936:18–19), Marie Wormington (1955) was the first to describe eastern Fremont pottery in detail, including what she termed Turner Gray – Variety I, a plain gray ware tempered with angular fragments of calcite. The calcite in similar black, dark gray, and polished brown sherds from "Fremont Basketmaker" pottery at Hell's Midden and Marigold's Cave, in Dinosaur National Monument in northwest Colorado, elicited considerable comment in a brief report issued shortly before Wormington's study:

> The source of the pottery and the origin in this area of the custom of tempering with calcite are questions of some interest. No example of calcite temper from the Pueblo areas has yet come to my attention, although calcite is sometimes found associated with other tempering materials.... It is unlikely that potters would choose calcite unless resources were limited, because it has the serious disadvantage of limiting firing temperature, which more than offsets the advantage of ease of pulverization. Even though a ware is normally fired at low temperatures there are likely to be occasional accidental hot blasts which will result in pitted or finely-spalled areas. Consequently, the use of calcite where there is a choice of more suitable materials may indicate a firmly-established custom which originated in a locality of limited resources. [Anna O. Shepard, report cited in R. Lister 1951:34]

Wormington noted considerable difficulty in finding limestone formations on the northern Colorado Plateau, carefully searching for and eventually locating calcite geodes in the Mancos Shale deposits of the Book Cliffs, in east-central Utah and western Colorado. “Since more suitable material was readily available and calcite was not easy to obtain, the use of this material appeared to be significant” (Wormington 1955:68). She also noted occasional use of crushed quartz temper, perhaps through mistaken selection of quartz geodes that can be found in the Mancos Shales, similar in appearance to (but more difficult to pulverize than) the sought-after calcite (Wormington 1955:73).

Other similarities between eastern Fremont and Promontory ceramics are extensive, though there would have been little reason to seek the comparison given the incorrect description of the temper in Steward’s initial report. Turner Gray – Variety 1 featured surfaces that were “eighty-two percent rough, irregular, undulating, [with] some shaping possibly done with fingers” and scraped with sticks or grass, and with the remainder being “smoother, [with] some evidence of rubbing, but not polished” (Wormington 1955:68–69). Decoration was exceedingly rare in the material Wormington described, though when it did occur, it featured the same motifs Steward reported in Promontory ware: two out of 2,385 sherds were rims with incised lines, and two vessels featured appliqué pellet collars.

Also referred to as Turner Gray – Cisco Variety (F. Lister 1960), the type may correspond with the “black earthenware vessels with decorated rim” (Lowie 1924:225–6) occasionally found on the Uintah Ute Reservation. However, even though Steward (1937*a*:43) invited the comparison between the little-reported pottery of this area and Promontory ware, it is the term Uinta Gray that caught on for the eastern Fremont material, owing to Steward’s earlier usage of Uintah Gray and the type's predominance in the Uinta Basin (Gunnerson 1969*a*:143–45; Watkins 2009:147; see also Ambler 1966; D. Madsen 1970); to this can reasonably be added the lack of other correlates between the Uinta Fremont and Steward's Promontory Culture that would have flagged a possible relationship.

While links to the northern Colorado Plateau were not examined at this time, James Gunnerson (1956:69–70) observed that the most distinctive attributes of Promontory ware, thickened rims with incised and punctate decoration, also appear with the pottery of the Dismal River aspect of the central Plains, which some authors had linked to "Plains Apache" groups (Champe 1949:241; Wedel 1949:329; note that Plains Apache could apply to any Dene-speaking group that historically lived on the Plains; Gunnerson and Gunnerson 1971:15; Newcomb 1970:3; see Chapter 3). Though calcite temper is not typical of Dismal River, the rarer quartz sand and mica tempers Steward attributed to Promontory ware do occur, while thicknesses are similar, colour ranges overlap, and handles are lacking on each. Gunnerson noted many other material culture correlates between Steward's Promontory culture and the Dismal River aspect. On this basis, he suggested Promontory, like Dismal River, to be an entirely Protohistoric phenomenon, drawing from an exclusively late attribution for Dismal River that has proven inaccurate (as has its geographic extent; see Gilmore and Larmore 2012). With this late attribution in mind, Gunnerson openly doubted evidence that Promontory and Fremont could have been contemporary, for example in mixed ceramics in the uppermost deposits at Black Rock Cave 3 (Enger 1942; see also Steward 1940).

Questions of Promontory-Fremont contemporaneity and Plains ties were greatly expanded on by Melvin Aikens (1966, 1967*a*, 1967*b*, 1970) through his work at Bear River 1 and 2 in the

Bear River wetlands, Injun Creek on the shores of Willard Bay, and at Hogup Cave, on the west side of Gunnison Bay opposite Promontory Caves 1 and 2. Here, Promontory ware and Fremont ceramic types regularly co-occurred, and evidence for bison hunting was often (but not always) extensive. Though he followed Rudy's (1953) typology in his ceramic analysis, Aikens found Rudy's suggestion that hand impressions had been left on vessel interiors during stick-scraping to be "implausible," arguing instead that a similar appearance between the undulating exteriors of Promontory ware and other wares known to have been shaped with a paddle and anvil (i.e., on the Plains) "quite adequately demonstrates that Promontory ware is of paddle-and-anvil construction" (Aikens 1966:33). Both pronouncedly thickened rims and markedly undulating vessel surfaces thus became important means of identifying Promontory pottery, despite neither attribute being so described at Promontory Cave 1. Aikens went on to speculate on the possibility of a Plains-based, possibly "Athabaskan" group having absorbed Desert Archaic peoples with Southwestern or Anasazi traits before returning to the Plains (Aikens 1966, 1967*b*:204–6). While he later withdrew the more adventurous claim that this could explain Fremont origins (Aikens 1972), the proposition was nevertheless established that Fremont and Promontory reflected contemporary variability within a common cultural grouping: more specifically, that "the 'Promontory culture' is an artifact of the archaeological misinterpretation of a few variant items of material culture from seasonal Fremont hunting camps" (Aikens 1966:74). Following Aikens's work, "the idea of a separate, post-Fremont cultural manifestation represented by Promontory pottery and other characteristics outlined by Steward" was not entertained for several decades thereafter (Forsyth 1986:181).

Additional work at sites where both Fremont and Promontory ceramics were recovered, including Bear River 3, Levee, and Knoll in the Bear River wetlands (Fry and Dalley 1979; Shields and Dalley 1978), and at Seamons Mound in Utah Valley (R. Madsen 1969), culminated in the drafting of two generally complementary typologies in which Promontory pottery was redesignated Promontory Gray (D. Madsen 1979; R. Madsen 1977); both expressly identified Promontory Gray as a ceramic type of the Great Salt Lake Fremont, omitting reference to the Promontory Culture. Noting technological differences in its production, however, Rex Madsen (1977:vi) did briefly suggest its origins as a separate ceramic tradition on the Plains, and David Madsen (1979:98–99) speculated on whether it was an intrusive trade item that did not share a common origin with other Fremont types.

Neither author contested Aikens's (1966, 1967*b*) argument that Promontory Gray was made with a paddle-and-anvil technique. R. Madsen (1977:24) remarked on Promontory Gray's "considerable crudity" and "extreme undulations (from paddle and anvil construction)," and D. Madsen (1979:95–96) suggested that the undulating surfaces of coiled-and-scraped Great Salt Lake Gray could be distinguished from the undulating surfaces of Promontory Gray by virtue of the former having "shallow and widely spaced undulations" and the latter having "undulations [that] are deep, numerous, and close together." They additionally sought to differentiate Promontory Gray from Uinta Gray, which was also commonly identified at the Bear River wetlands sites, and which D. Madsen (1979:98–99) felt had likely been underreported in Aikens's earlier analyses. R. Madsen (1977:28) offered that particles of crushed calcite are smaller in Uinta Gray ("almost always… less than .6 mm") than in Promontory Gray ("frequently… up to 1.0 mm. in size"), while other attributes such as color, surface treatment ("rough and scraped with slight undulations"), vessel shape, and body decoration overlap. D. Madsen (1979:81) noted the difficulty of distinguishing Uinta from Promontory Gray, but stated that Promontory Gray is slightly thicker, at 0.4–0.5 cm, than the "much more uniform" 0.4 cm of Uinta Gray (cf. Wormington 1955:68–69, who gave an average of 0.6 cm for the latter), and that Uinta Gray, at least as represented in the Bear River wetlands, has a smooth surface finish (again cf. Wormington 1955:68).

Discussion of distinctive Promontory rim decoration fell by the wayside in both these authors' works; R. Madsen made no mention of the flattened, usually decorated rims observed by Steward, while D. Madsen reported only rare decoration, with one of eight Promontory Gray rim sherds at the Levee site, from a vertically rimmed vessel, having punctates perpendicular to the square lip (D. Madsen 1979:88–89). He did note a frequent "fingernail-impressed rim design" in the late component at the Levee site with 10 of 83 Great Salt Lake Gray rim sherds, 2 of 31 Uinta Gray rim sherds, and 1 of 17 Sevier Gray rim sherds (D. Madsen 1979:90–91), but this appears to describe a decoration on the exterior surface, high on the neck up to the edge of the rim (hereafter referred to as "dentate") rather than transversely incised across the rim as reported by Steward.

Jesse Jennings (1978:173) felt that D. Madsen's work in particular "pretty well established that the Promontory tradition is somehow alien in the Fremont setting. His findings open anew the problem of the Promontory culture and its relationships to the Fremont." Jennings went on to ask, given the Promontory culture's emphasis on bison, whether, "[w]ith the Great Salt Lake Fremont so clearly oriented to game of all sorts, can it actually be a blending of the restricted Plains-flavored Promontory culture and the Uinta Fremont? If so, the matter is by no means solved…" (Jennings 1978:179).

Approaching this question from a different angle, Forsyth (1986:183–94) began his reappraisal of the Promontory Problem with ceramic assemblages in Utah Valley, including the Beeley site, Heron Spring, Hinckley Mounds, Seamons Mound, Spotten Cave, the Williamson site, Woodard Mound, and a number of sites on the shore of Utah Lake (Beeley 1946; Christensen 1947; D. Green 1961; Janetski 1983:83–4; J. Mock 1971; Nelson 1984:54; Steward 1933:15–17; Reagan 1935*a*:65–72, 1935*b*:13; Richens 1983). Here, two classes of pottery were evident. A relatively thin (5–6 mm) grayware, well-smoothed and finished, with globular shapes, strongly restricted necks, everted or cylindrical rims, rounded or tapered lips, and rare decoration including fingernail- or stick-impressed necks and coffee bean appliqué collars, was felt to correspond with Fremont types including Great Salt Lake Gray and Sevier Gray. These very rarely exhibited rim-top decoration and included considerable numbers of handles. The other class, which Forsyth felt corresponded with descriptions of Promontory Ware, exhibited thick (8–9 mm) walls, poorly smoothed and lumpy surfaces, globular shapes with wide mouths and slight neck restrictions, a general lack of body decoration, an almost complete nonexistence of handles, and distinctive folded, thickened lips, sometimes with incised or punched decorations on the rims. The carelessness with which the rims were shaped was a new observation for Promontory pottery:

> In contrast to Fremont pottery, vessel rims were poorly made; rather than forming a flat, horizontal plane, the tops of vessel rims are irregularly and carelessly formed. This same lack of care is exhibited at the base of the exterior lip fold where it meets the vessel wall. Here also the base of the fold is irregular. [Forsyth 1986:187]

Forsyth's observations on handles, surface treatment, and vessel shape reflect trends seen at the Bear River sites, while other aspects of his classification are difficult to reconcile with previous descriptions of Promontory ware. Decorative motifs which Steward noted in low numbers at the Promontory Caves are here associated with Fremont types, as is, rarely, the distinctive rim decoration. There is, meanwhile, no precedent in the sites at the north end of the Great Salt Lake for the wall thickness of Promontory pottery in Utah Valley; even the 5–6 mm thickness Forsyth (1986:194) reported for Promontory Cave sherds is out of alignment with previous studies, but mirrors the creep in rim thickness metrics that first appeared in Rudy's work. Also highly uncharacteristic of earlier descriptions is the lack of calcite temper in Utah Valley Promontory ware; Forsyth (1986:193) did not describe what this pottery was tempered with, mentioning only that calcite was "rare." It is in fact, entirely absent: the temper was later identified mainly as off-white to pinkish "porphyritic aphanitic dacite/andesite" (Smith and Janetski 2007:334).

These morphological differences are accompanied by differences in site distribution, settlement pattern, and artifact assemblages, findings which Forsyth felt contradicted arguments for the attribution of Promontory pottery as Fremont-contemporary (cf. Aikens 1966, 1967*b*; Marwitt 1970:146; Shields and Dalley 1978). Forsyth (1986:195) instead revived the idea of Promontory as a distinct cultural pattern appearing to be chronologically subsequent to Fremont. Revisiting collections from the northern Great Salt Lake and using the pottery classes from Utah Valley, Forsyth concurred with D. Madsen (1979:98–99) that the presence of Promontory pottery in the Bear River area had been overstated by Aikens.

> The pottery labeled "Promontory" in the Bear River collections is Fremont pottery with coarse, roughened surfaces. In terms of vessel wall thickness, vessel form, rim shape, and decoration, it conforms to the normal patterns of Fremont ware. Only with respect to surface finish, and perhaps temper, does it differ from the more typical Fremont pottery at these

> sites. Even given the coarser surfaces of the pottery labeled "Promontory," these sherds do not resemble the irregular, undulating, lumpy surfaces of Promontory pottery from Utah Valley. Included in the category labeled Promontory are a few unusual thick-walled sherds that differ from *real Promontory pottery* in terms of surface finish, vessel form, rim form, decoration, and firing. Nevertheless, Promontory sherds do occur at some of the Bear River sites,... but in such small numbers that they may be of little significance. [Forsyth 1986:194; emphasis added]

On this basis, Forsyth went on to redefine the Promontory Culture based on the Utah Valley sites, where it appears with a subsistence strategy "heavily oriented toward exploitation of lake resources... such as fish, waterfowl, and marsh plant resources," supplemented by an array of large mammals, particularly bison, in winter (Forsyth 1986:197).

Forsyth (1986:194, 198) was unequivocal in his opinion that the Promontory Cave sherds he reexamined were identical in appearance and manufacture, including paddle-and-anvil construction, to what he identified as Promontory pottery in Utah Valley. The matter remained contested, however. Patricia Dean (1992) included all of Steward's body sherds from Promontory Cave 1 in a broad study of construction techniques in Great Salt Lake-area pottery. Despite noting an unusual preponderance of "recrystallized limestone" (i.e., calcite) temper, she found no attributes not shared with Fremont ware, including construction method, thus concluding there was only one pottery tradition—Fremont—in the Great Salt Lake area (Dean 1992:140–4; see also Dean 1983). Joel Janetski (1994:166) further refuted the notion of differences in construction between Promontory and Fremont ceramics, noting that the term "paddle-and-anvil" properly refers to a finishing technique rather than a construction method and thus would have been applied to coil-built vessels (see also Shepard 1957).

It would not be accurate to suggest that coil construction is necessarily a technology of Fremont origin (cf. Dean 1983), or that it would be an alien technique to a population arriving in the eastern Great Basin should they first have encountered pottery on the Northern Plains (cf. Aikens 1966, 1967*b*). Coil construction, sometimes including visible coil breaks, has been noted in Saskatchewan Basin and Laurel pottery variants at sites dating to before the turn of the first millennium AD from Alberta to Manitoba (Byrne 1973; Meyer and Walde 2009), as have shouldered vessels with slightly restricted necks and outward-flaring rims in Montana and southern Alberta (Peck and Hudecek-Cuffe 2003:83; Quigg 1988; Walde et al. 1995:22; Wormington and Forbis 1965). Here as well, though, it may be futile to attempt judgment of construction technique from surface impressions alone, as surface treatment can obliterate all trace of coils (MacDonald 2014:21–2).

Providing evidence for coil construction and hand smoothing in Utah Valley Promontory ware, Grant Smith (2004:28–9) argued for the importance of debunking the myth that bumpy surfaces connote paddle-and-anvil construction, "since it means that there is no real connection between poorly-made Fremont vessels, that appear to be constructed by paddle-and-anvil, and Steward's Promontory Ware." What differences can be reliably described lie elsewhere. Smith (2004; see also Janetski and Smith 2007:330–7) maintained that other attributes identified by Forsyth (1986), especially as captured in the distinctively thickened, folded, and in some cases decorated rims of pottery at Utah Valley sites, coupled with differences in the aperture and neck shape of globular ollas, a tendency for vessels to be larger (up to 30 or even 35 cm in diameter), and the absence of handles, constitute sufficient contrasts to uphold the classification of Promontory pottery as a distinct tradition from Fremont ware. This identification is supported by dates of between AD 1300 and 1600 from a number of sites in Utah Valley that post-date the Fremont era (Janetski and Smith 2007:338), and by contemporaneous assemblages in the Salt Lake Valley (Allison et al. 2000) and at the Orbit Inn site (Simms and Heath 1990:798), which Janetski (1994) has termed the Promontory Phase of the Late Prehistoric period, featuring settlement patterns and subsistence strategies much as Forsyth (1986) had described.

Recapitulating the many historical changes to the definition of Promontory pottery in a few brief points, I offer the following summary:

1. Steward defined Promontory ware primarily from the assemblage at Promontory Cave 1, which was thin-walled and dark-colored, with surfaces that, while rough, were often extensively scraped and even polished. The pottery was primarily (but not exclusively) calcite-tempered and featured rims that often featured distinctive incised or punched decoration. Rims were slightly thickened, and the thickest examples were also often flattened, but numerous rounded and tapered rims were also illustrated. The people who made this pottery—Steward's Promontory Culture—had a primarily bison-hunting subsistence, supplemented with capture of other, lower-yielding big game.
2. Calcite-tempered pottery is also prevalent at Uinta Fremont sites antedating the Promontory Culture along tributaries of the Green River on the northern Colorado Plateau, where it is roughly finished and dark-colored, with rounded or tapered rims that

are occasionally decorated with incised or punched decoration, and commonly features handles.

3. Elsewhere around the Great Salt Lake, late Fremont-affiliated sites often contain calcite-tempered pottery that ranges from thin and finely finished to thick, undulating, and crude as a minor component of assemblages dominated by Fremont grayware. A convention has emerged of calling the well-made calcite-tempered specimens Uinta Gray and the crude-looking specimens Promontory Gray or Promontory ware, though the two types are often difficult to tell apart. Bison remains are often more abundant at these wetland sites than other settlements associated with Fremont occupations.
4. Calcite-tempered pottery is virtually unknown in Utah Valley, but thick, crudely made pottery with rough, undulating, and poorly finished surfaces and thickened, folded, sometimes decorated rims is common. This material post-dates Fremont occupations and the caves and is associated with Promontory Phase people who possessed a strong wetlands foraging adaptation.

Ceramics and Culture Change

Greater variability may exist in the ceramic record than can be captured by definitions of normative "Promontory" or "Fremont" types; overlaps in aspects of pottery production between the two "suggest that a simple across-the-board replacement of one set of peoples by another was unlikely" (Madsen and Simms 1998:318). One line of reasoning that has been offered for the occurrence of thicker, cruder pottery at later sites is that the variability may reflect changes in residential mobility over time (Simms et al. 1997). Though functional adaptations would doubtless have accompanied the many, often drastic changes in lifeways that occurred in the Fremont–Late Prehistoric transition, such reasoning offers little in the way of explanation for the persistence of more esoteric attributes of pottery production including temper selection and decoration. These, I hold, reflect culturally informed values and preferences with distributions over time and space that are non-random, and that reflect the historical trajectories of specific groups of people. Promontory Cave 1 offers a prime opportunity to investigate how these processes unfolded with the arrival of Proto-Southern Dene in the northeast Great Basin.

Grappling with similar issues in the identification of earliest Proto-Ndee ceramics in Dismal River pottery, Kevin Gilmore and Sean Larmore (2012:66) have argued that such pottery would confound typological assessment, featuring attributes acquired in the course of a historical migration to the Intermountain west via the Plains. "[I]t is precisely these amalgamated or hybridized pottery forms that we should expect and look for in order to identify early Athapaskan ceramics in the archaeological record." Significantly, with the exception of the Promontory Caves and a few sites along Utah Lake (Forsyth 1986; Janetski and Smith 2007; Smith 2004; Steward 1937*a*), sites where an exclusively Promontory attribution has been reported are rare. Mixed assemblages where Promontory ceramics (usually identified as Promontory Gray) appear alongside Fremont types are common, especially in the Bear River wetlands, but also elsewhere around the Great Salt Lake. This mixing includes sites where multiple distinct types have been identified (Aikens 1966, 1967*a*, 1970; Shields and Dalley 1978; D. Madsen 1979*b*; cf. Forsyth 1986) and sites where individual sherds bear attributes common both to Promontory and Fremont types, presenting a classificatory challenge (Allison 2002).

Rather than being a "Promontory problem," I believe this mixing, both of types and attributes, is an asset, as it informs us about what type of social interactions were taking place between contemporary groups. The gradual emergence of stylistic variability—as, for instance, in ceramic types—is often theoretically attributed to a bias for the familiar. Underlying principles of group differentiation embodied in practice theory (Bourdieu 1977, 1984, 1990:54) and social identity theory (Tajfel et al. 1971; Turner et al. 1987) are reviewed in Chapter 4, as are the mechanisms outlined in the contact hypothesis (Allport 1954; MacInnis and Page-Gould 2015; Page-Gould et al. 2008; Paolini et al. 2010; Pettigrew and Tropp 2006; Prentice and Miller 1999) that can promote groups coming together, as opposed to drifting apart, in ethnogenetic rather than phylogenetic processes of culture change. Many lines of evidence about Southern Dene prehistory—oral tradition (Brugge 1994, 2003, 2006; Zolbrod 1984), genetics (Achilli et al. 2013; Malhi 2012; Malhi et al. 2003; Monroe et al. 2013), and material culture (Eiselt 2012, etc.)—indicate the importance of the flow both of information between groups and the movement of people themselves: there is abundant reason to believe ethnogenetic processes played an important role in the emergence of Proto-Southern Dene groups.

Two complementary social factors have been identified that would promote the formation of social networks spanning considerable geographic distances. On the one hand, structural differences in kinship reckoning, and particularly rules about the suitability of individuals within or outside the local group as marriage partners and the preferred postmarital residence of newlywed couples, can inherently predispose groups to actively seek or avoid out-group contact (Ives 1990, 1998). Local Group Alliance (exogamous) groups, though prone to dissolution as their members leave for other groups, readily exploit a network of alliances built through kinship ties for the purposes of survival in times of need, and for gathering sufficient numbers of people to engage in communal hunting beyond the capacity of any individual band. Local Group Growth (endogamous to agamous) groups can subsist in comparative isolation, or even on outright hostile terms with outsiders, and tend to be subject to fissioning after growing beyond a certain size. The need for human resources in communal hunting activities suggest another powerful motivation for seeking out positive out-group contact, both on purely economic terms and in individuals' pursuit of status or prestige (Baugh 1982, 1986; Habicht-Mauche 2005, 2008, 2012; Spielmann 1982, 1991; Vehik 2002). Just as the Local Group Growth and Local Group Alliance patterns can play a role in determining the type of subsistence activities practiced by a group (opportunistic, small-scale game hunting vs. communal hunting), economic factors may have been strong enough to drive shifts in how groups organized themselves to promote alliance and exogamy over local growth (a change all Proto-Southern Dene groups apparently underwent; see Dyen and Aberle 1974:230–231; Ives 2010; Ives et al. 2002), or vice versa.

Assemblages left by groups following the Local Group Growth pattern should show very little influence from outside groups. Differentiation should be strictly maintained between groups with limited (neutral or weakly positive) contact, and assemblages should reflect strong differences in types (Figure 4.1). As social boundaries become more porous and members of different groups freely move across them (or as the social identities of groups become more complex), the social reasons for signaling differences between groups should break down, and type-level distinctions with them. These considerations should inform us about what groups the people at the Promontory Caves were (or were not) in contact with and recruiting from, and should shape our expectation of what the earliest Proto-Southern Dene ceramics would look like.

Methods

The new ceramic collections from Promontory Cave 1 and Chournos Springs offer a unique opportunity to revisit characterizations of the Promontory ceramic tradition and to assess the implications of morphological variability for Promontory–Fremont contact, the social recruitment of female potters into Promontory society, and origins of the tradition.

Site chronology

With the newly excavated materials from Cave 1, careful stratigraphic control allows changes over time to be investigated; for the purposes of the present discussion, all sherds from the recent excavations at Cave 1 (n = 651) are included, focusing on the well-stratified Promontory-era deposits in the sondage at the front of the cave (n = 400; Component E1–3, Figure 2.1). Because no stratigraphic sorting is possible for the ceramics that were originally excavated by Steward (1937*a*; see also Dean 1992 and Smith 2004), the previously analyzed specimens have been excluded from this analysis.

Stratigraphy at Chournos Springs is described in Chapter 5. Briefly, an earlier, aceramic Archaic component (Component A) is present at the site, while the structure floor is overlain by 23–24 cm of midden-like fill containing extensive cultural materials. Artifacts from the pit house floor comprise the site's well-dated Component B1. This is sorted, by excavated depth, into a 10–12 cm "floor zone" corresponding with the fill between the interior floor and a contemporary exterior surface (Component B2) and two arbitrary ~5 cm levels above the depth of the exterior surface (Components C1 and C2), interpreted as time-transgressive accretional zones rather than individual occupation events. Attempts to obtain dates for the weakly stratified upper fill have so far been unsuccessful, but the material, in part based on the ceramic evidence discussed here, is presumed to postdate both the structure's abandonment and the caves'. The Component B and C materials offer respective baselines for the ceramics of the local Great Salt Lake Fremont and, more broadly, the subsequent Late Prehistoric period. While the full ceramic assemblage from Chournos Springs (n = 357) also includes specimens recovered from test pits and surface collections, discussion here focuses on pieces attributable to Components B and C (n = 315).

Thus, a proposed chronological order for these materials is:

1. Component B1 at Chournos Springs, dating from between approximately 985–1255 cal. yr. A.D., and possibly B2, which is weakly defined and possibly mixed with later material,
2. The well-stratified Promontory-era assemblage (Components E1–3) from Cave 1, dated to 1240–90 cal. yr. A.D., and
3. Components C1 and C2 at Chournos Springs, which are presumed to postdate ca. A.D. 1255 based on stratigraphic superposition.

Note that the date range for Cave 1 overlaps the suggested ranges both for the Component B materials at the early end and the Component C materials at the later end, and the Chournos Springs assemblage may, by this reasoning, capture a significant moment of cultural change.

Characterizing ceramic assemblages

Ceramic typologies are intended to reflect population-level differences in ideas about how pottery should be made. This knowledge is generally assumed to have been held by communities of potters—mostly the women within a given population—with uniformly shared background and ethnic identity (Arnold 1985; G. Smith 2004:33–34). Morris Opler's (1938, 1946:93–97, 1971:30–32) ethnographic observations of clay collection and pot manufacture by Jicarilla women are illustrative of the highly conservative ritual and supernatural constraints that could inhibit variation in ceramic production, resulting in ceramics distinct to individual communities. Considered a normal aspect of a girl's training, the maternal grandmother played an important role in instruction, indicating that ceramic traditions feature knowledge transfer heavily skewed towards the matriline. The entire process, from preparations before venturing out to collect the clay, to excavating it, to shaping, finishing, decorating, and firing the pots, was heavily ritualized, with numerous proscribed behaviours for both the women and the men who assisted them in carrying the clay. Violation of any of the many rules would result in failure of an aspect of the enterprise, ranging from defective decoration to a fractured or exploded vessel. For the analyst, virtually every attribute of a ceramic object that can be defined, from raw material to vessel form, decoration, surface treatment, and more, is governed by the culturally determined constraints Opler (1938, 1946, 1971) described.

Populations engaged in high levels of exogamous intermarriage, and recruiting women of different ethnic backgrounds into a single community, should be expected to have produced less typologically distinct ceramics, however, manifesting in predictable ways. For instance, multiple ceramic styles may have been locally produced (i.e., from the same source clay). With prolonged positive intersocietal contact and demographic shifts of an ethnogenetic character, attributes would be transposed across erstwhile types, blurring distinctions between social boundaries as women shared knowledge of different styles and techniques and new community identities formed (also note Hodder's [1982:68–72] insightful commentary in this regard).

The selection of which attributes are most significant for identifying communities of potters, as noted in the earlier review of previous ceramic classifications of Great Basin ceramics, has often been inconsistent. Most recently, Christopher Watkins (2009) has made a convincing case for reclassifying Great Basin ceramics using a three-tiered system of ware, series, and type (following Colton and Hargrave 1937). Ware, the highest order, represents fundamental technical concepts of vessel construction, function, and form: for instance manufacturing technique, vessel size and shape. The subcategories—series and types—are assumed to possess "genetic" relationships to each other (Colton and Hargrave 1937:3), as local variations within a tradition of shared origin, or ware. Watkins (2009) recommended discriminating series based on temper, an aspect of local raw material availability, and types primarily on other subtle differences such as decoration where all other key attributes are shared. It should be noted, however, that Watkins did not attempt to include Promontory ceramics in his re-seriation of Fremont Grayware, accepting the proposition, based primarily from materials in Utah Valley, that Promontory ceramics were constructed differently enough to constitute a separate ware (Watkins 2009:147; following Forsyth 1986; Janetski 1994; Janetski and Smith 2007; G. Smith 2004).

The classificatory methods proposed by Watkins are generally followed here, sorting an extensive (but not exhaustive) list of attributes into classes that reflect the proposed hierarchy of ware, series, and type. In assessing the presence of different wares, attributes that may be related to overarching concepts of construction and utilization are considered, including vessel shape, vessel size, wall thickness, and construction method. Rim morphology (shape and thickness), which has been used as a primary basis for distinguishing Promontory from Fremont ware (Forsyth 1986; G. Smith 2004), is also considered at this level.

To evaluate series, sherds were categorized based on the use of different tempering materials, identified through examination under stereoscopic magnification (up to 200X) of washed or freshly snipped sherd cross-sections. Principal and secondary temper types were recorded, in addition to maximum temper particle size and relative intensity of temper use (either very sparse, where individual temper grains were difficult to identify, or very dense, where the proportion of temper particles appeared greater than the surrounding paste matrix). Instead of subjecting sherds to an acid-reaction test for the presence of calcium carbonate tempers, for which calcareous clays and marine shell can produce a false positive (D. Madsen 1979*b*:82), a Mohs hardness test was employed, wherein individual white crystalline temper particles were scratched under magnification with the point of a stainless steel caliper. Those that were scratched by steel (i.e., Mohs hardness <5.5) were classified as calcite, while those on which the steel left a grey streak (i.e., Mohs hardness >5.5) were classified as quartz. The same process was used to distinguish occasional pinkish-tinged calcite particles from feldspar (Mohs hardness 6.0–6.5).

Finally, sherds were assessed based on different decorative elements, including rim and body decoration, which may aid in identification of distinct types. Different surface treatments (i.e., scraped or unscraped, undulating or smooth, and lustrous or non-lustrous), do not appear to correspond with different construction techniques (Dean 1992; Janetski 1994; Smith 2004), and so are also discussed here at the level of type.

Because the accuracy, meaning, and validity of existing named ceramic classes are central questions of this study, I have reserved such nominal attributions as "Promontory ware" or "Great Salt Lake Gray" for a late stage of analysis, instead grouping specimens by the metric and non-metric attributes with which such hierarchical classes can be defined. Thus, through much of the following discussion, reference is made to such categories as "the sand-tempered grayware from Chournos Springs" or "the black, calcite-tempered pottery from Cave 1." This is done out of a desire to avoid prejudging the results or biasing their interpretation, which can occur in at least two ways. First, using terms such as "Great Salt Lake Gray" could lead to unnuanced generalizations about the cultural affiliation of a site as a whole; Great Salt Lake Gray was made by the Great Salt Lake Fremont, or so the reasoning goes, but it is at least suspected that populations could have been more diverse. Attributions of cultural identity should therefore be reserved for a more comprehensive consideration of complete assemblages, not ceramic types alone. Second, attributions of ceramic type also imply that the material is itself *typical*: that is, that all of its attributes match established descriptions for their respective types. Putting aside discrepancies in the typologies, the analyst is presented the equally undesirable options of either pigeonholing non-conforming materials into known categories and minimizing the significance of unusual attributes (a deficiency of Fremont typologies in particular that has been pointed out by Watkins [2009]), or putting aside substantial portions of the assemblage as "unclassifiable," as has been done on occasion (i.e., Allison 2002). Unclassifiable ceramics—that is, those which bear attributes of more than one type, and so do not fall easily into one or another category—are predicted in a culture contact scenario and are one of the principal objects of interest in this analysis.

Paste analysis

To more thoroughly explore the origins of Promontory ceramics and test hypotheses that Promontory Gray at Bear River sites was of non-local origin (D. Madsen 1979*b*) or, as proposed here, that multiple styles were produced locally, from the same clay, by polyethnic groups, paste analysis of selected ceramic specimens was conducted through laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS, or laser ablation). Three batches of sherds, totaling 119 specimens from Promontory Caves 1 and 2, Chournos Springs, 10OA275 (a Promontory-affiliated bison kill site in the Curlew National Grassland in southeast Idaho, provided by Brooke Arkush of Weber State University), and a number of sites from the northern Great Salt Lake area (provided courtesy of the Natural History Museum of Utah) were processed by Dr. Hector Neff of California State University, Long Beach, using a GBC Optimass 8000 time-of-flight ICP-MS at the Institute for Integrated Research in Materials, Environments, and Society (Neff 2012; Hector Neff, pers. comm., 2015) and a GBC Optimass 9500 at the Getty Conservation Institute (Neff 2013), together with a New Wave UP213 laser ablation system.

This minimally destructive method, targeting microscopic points on a sherd's surface, yields part per million values for a selection of major and minor trace element constituents of either pastes or tempering agents, as desired. In the case of a sherd's clay matrix, laser ablation offers a highly precise means of assessing whether individual sherds were composed of the same or different clay mineral bases, irrespective of their more readily observed macro- and microscopic properties. Assuming that clay with a given elemental composition has a limited geographic availability (a proposition that presently remains untested in the study area, as no viable clay sources have been identified; Neff 2012), insights may be gained regarding residential mobility and local production.

Averages from five separate 75-μm-diameter ablation points in the clay matrix of each sherd were calculated in the first batch together with a similar analysis of individual temper particles (Neff 2012), while three points from the clay matrix were averaged in the second and third batches, avoiding temper and natural nonplastics (Neff 2013; Hector Neff, pers. comm., 2015). These were calibrated against four National Institute of Standards and Technology glass (SRM614, SRM612, SRM610, and Little Glass Buttes obsidian) and brick clay (SRM679) reference standards.

Results

A visual overview of the ceramic assemblages at Chournos Springs and Promontory Cave 1 is presented in Figure 7.2 as networked groups of attributes, showing frequency of selected attributes and their relationship with each other. This representation is intended to convey, at a glance, the considerable variability inherent to both assemblages that tends to be glossed over in type descriptions of ceramics from the Great Salt Lake area—notably, Great Salt Lake Gray and

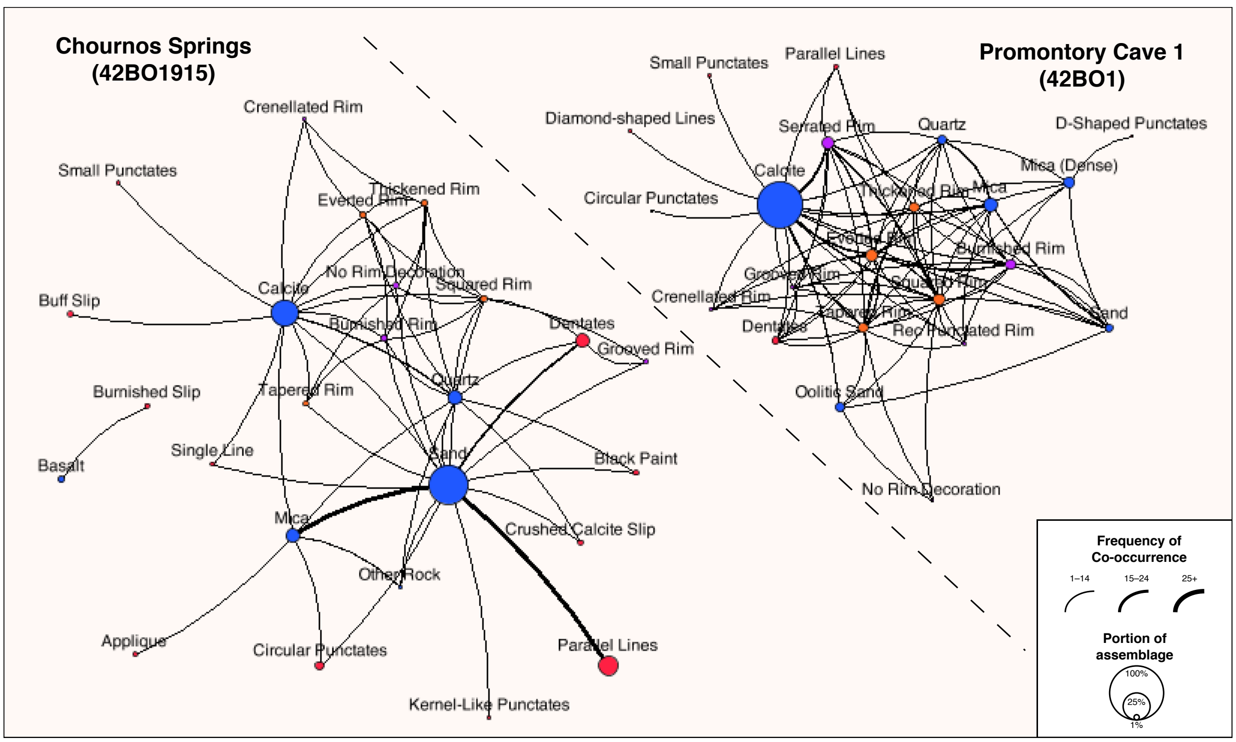

Figure 7.2. Networked relationship between temper and stylistic attributes (rim shape, rim decoration, body decoration) at Chournos Springs and Promontory Cave 1. Graphic prepared using Meerkat Lite (Goebel and Zaïane 2015).

Promontory Gray—in which a degree of uniformity is ordinarily implied. That is, many specimens, even if occurring in low frequency, are non-normative to any given type. When considering the expected outcomes of intergroup contact and ethnogenetic change, there are very good reasons why this should be the case.

While both assemblages possess marked temper variability, immediate, population-level differences are apparent. The predominance of sand temper stands out at Chournos Springs, while calcite is quite predominant at Cave 1. Much of the stylistic variability within these assemblages, including in body decoration, rim shape, and rim decoration, does not correspond equally with each temper; attribute clusters may support the validity of distinct ceramic series and types (following Watkins 2009), but in some cases, motifs common to one temper variant at one site are found with a different temper at the other site. For instance, thumbnail punctates are found with sand-tempered ware at Chournos Springs and with calcite temper at Cave 1.

Local ceramic sequence

Figures 7.3 and 7.4 show the frequencies of ceramics with different primary temper types within the stratigraphic sequences from Chournos Springs and Promontory Cave 1 and whether the tempers occurred individually or mixed with lesser amounts of other materials (indicated with an asterisk [*]). These raw material types are discussed in greater detail below. Site totals, including test excavations, other excavation units, and surface collections, are shown in Table 7.1. Significantly, temper use changed over time at both sites, with the inversion of the prevalence of sand temper and calcite being the single most evident difference in the ceramics between the two sites, and between the early and late components at Chournos Springs.

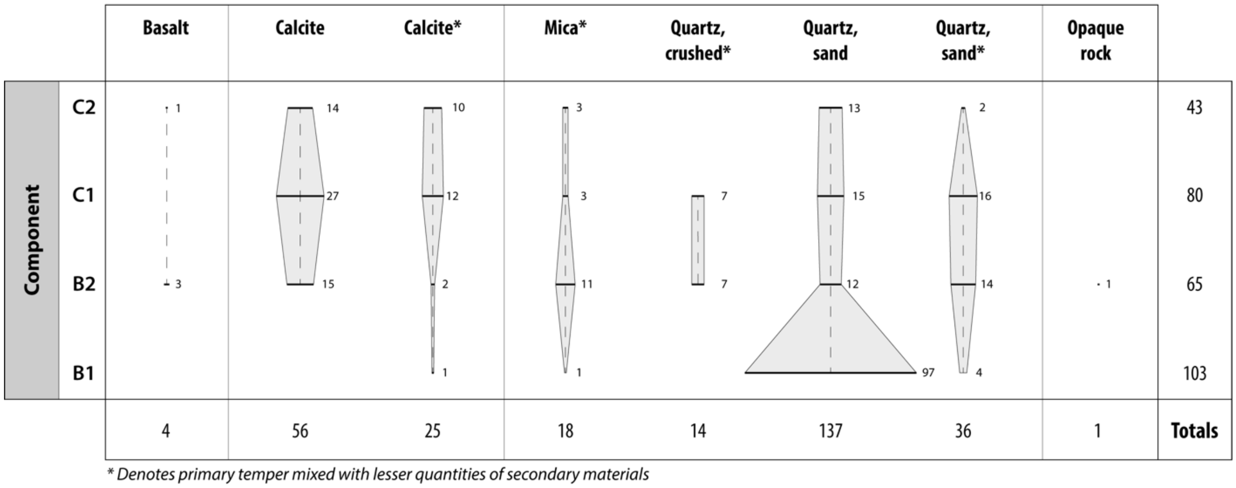

Figure 7.3. Frequency of ceramic temper types sorted by cultural components, Chournos Springs.

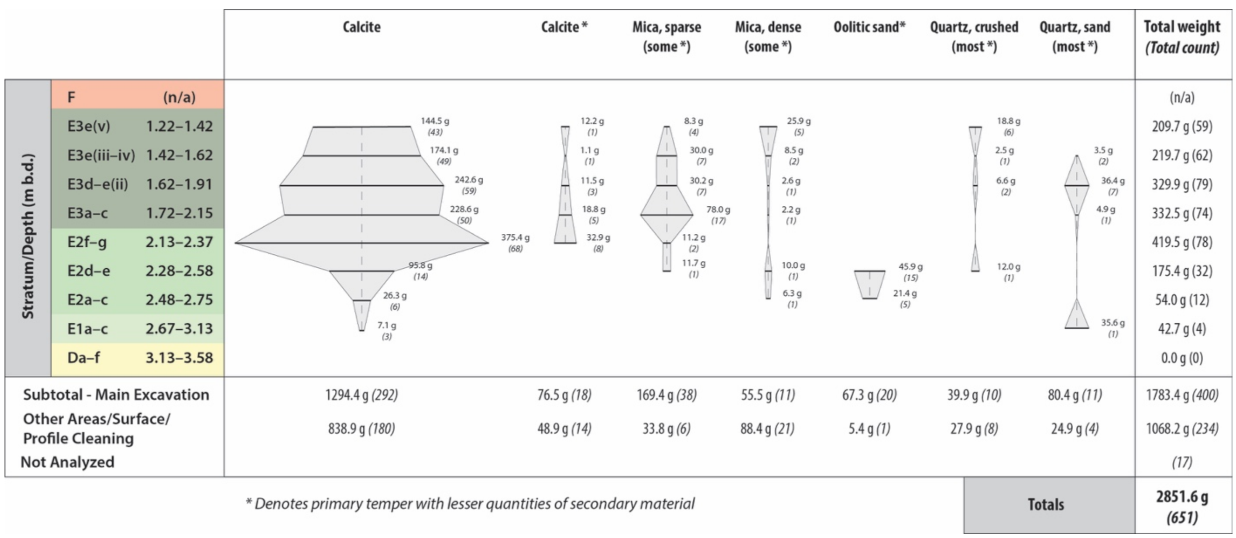

Figure 7.4. Frequency of ceramic temper types sorted by cultural components, Promontory Cave 1. Strata are from sondage at front of cave (see Figure 2.1).

While the prevalence of calcite takes the form of a gradual replacement of quartz sand temper at Chournos Springs, calcite appears to have been the dominant temper type for the duration of the Promontory occupation of Cave 1. The deepest pottery recovered in Cave 1 (stratum E1b) is in fact a single, exceptionally thick (8.9 mm) sand and opaque rock-tempered specimen. Its provenience is somewhat in doubt, given the cramped excavation quarters at this

Table 7.1. Frequency of primary temper types, Chournos Springs and Cave 1.

Site/ Component	Aragonite	Basalt	Calcite	Mica	Mica (Dense)	Opaque Rock	Quartz (Crushed)	Quartz (Sand)	Total
Chournos Springs (Total)		5	95	25		1	27	201	354
B1			*1*	*1*				*101*	*103*
B2		*3*	*17*	*11*		*1*	*7*	*26*	*65*
C1			*39*	*3*			*7*	*31*	*80*
C2		*1*	*24*	*3*				*15*	*43*
Promontory Cave 1 (Total)	21		505	44	32		18	14	634
From defined strata	*20*		*310*	*38*	*11*		*10*	*11*	*400*

depth (a 40 cm^2 area at ~1.8 m b.s.) and the possibility of wall spoil being knocked into the pit. The stratum from which it was recovered is meanwhile immediately overlain by a layer of burnt bone, ash, and debris associated with a hearth-cleaning event (stratum E1c) that is stratigraphically inverted (John W. Ives, pers. comm., 2016). It is within this hearth-cleaning debris that three sherds of the predominant calcite-tempered pottery first appear. With the exception of the specimen from E1b, primarily sand-tempered pottery does not reappear until much later in the Cave 1 ceramic sequence, opposite the trend seen at Chournos Springs.[27]

Wares: Evaluating vessel construction

The first question that can be put to the Promontory Point assemblages is whether there are core morphological differences in how ceramic vessels were constructed or used, that is, at the classificatory level of a ware. Forsyth (1986) has provided the strongest case for Promontory pottery being distinguishable from Fremont ware based on contrasts in thickness, vessel size, vessel shape, and rim morphology. Wall thickness and vessel size may also correspond with shifts in pottery construction from the Fremont era to the Late Prehistoric (Madsen and Simms 1998; Simms 1990).

Wall thickness

Maximum wall thicknesses (excluding thickened rim areas, when present) from Chournos Springs and Cave 1 are given in Figure 7.5. The Chournos Springs average is 5.1 mm; the early, almost exclusively sand-tempered specimens from Component B1 are, on average, even thinner at 4.6 mm, while in Components B2, C1, and C2, where large numbers of calcite-tempered specimens have been found, thicknesses match the site average at 5.1 mm. At Cave 1, sherds average 5.2 mm, slightly thicker than the 4.8 mm average given by Steward (1937:46) and 5.0 mm average given by G. Smith (2004:127).

Only a very small number of specimens from each site (n = 4 at each) fall within the 8–9 mm range typical of Promontory ware in Utah Valley (Forsyth 1986:185; Smith 2004). The ~15%

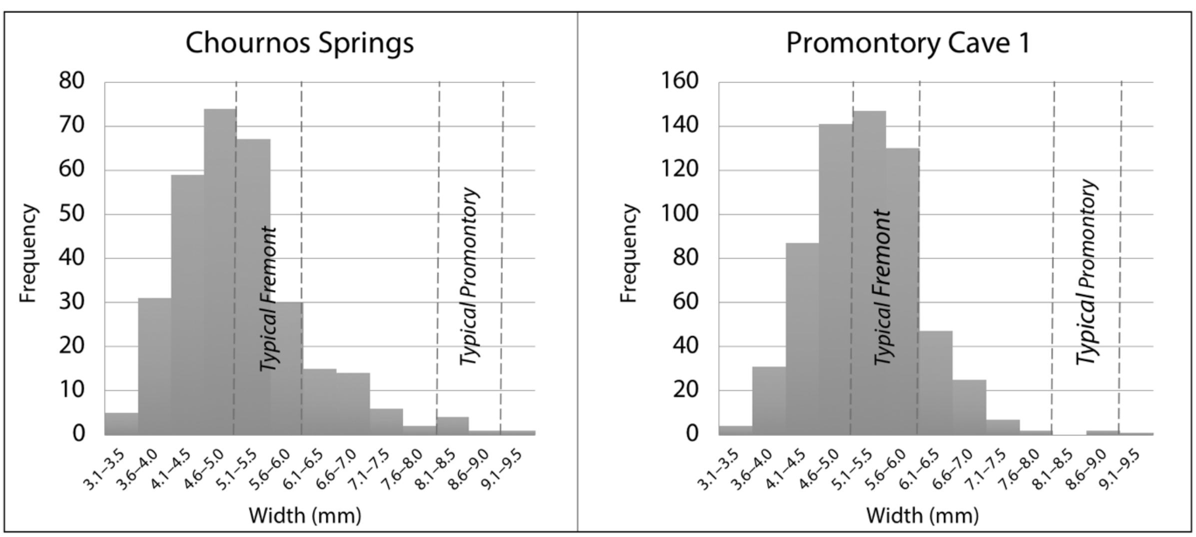

Figure 7.5. Histogram of maximum wall thicknesses, Chournos Springs and Promontory Cave 1. Typical sherd widths for Fremont ware and Promontory ware per Forsyth (1986).

increase in sherd thickness between earlier and later components at Chournos Springs, and between the Chournos Springs and Cave 1 assemblages, is negligible when considering that either assemblage averages at the low end of the 5–6 mm average thicknesses variously given for Fremont Ware, Great Salt Lake Gray, and Uinta Gray (Forsyth 1986; R. Madsen 1977:23, 27).

Vessel shape

No complete vessels were recovered at either site, although in cases substantial refits were possible. Vessel shape was interpreted from rim stance and angle (following P. Rice 1987:222); from the curvature of body sherds indicating the presence of neck constrictions, out-curving shoulders, or bottoms; and from the placement of decoration. At Chournos Springs, two bowl fragments were identified, one from a very small (10-cm-diameter) vessel (Component B1), and another from a black-on-gray painted vessel (Component C1). At Cave 1, fragments of one unusual object (tempered with oolitic sand, discussed below) had a very high rim angle and little wall curvature, suggesting a very slightly concave, disc-like form.

The remainder of the sherds from both sites are interpreted as being from globular ollas. No fragments were found suggesting conical vessel shapes with pointed bottoms, nor of flattened bottoms typical of Intermountain ware. However, occasional slightly thickened, scorched, and symmetrically rounded fragments were recovered (n = 2 at each site) that could be from vessel bottoms.

Olla rim sherds from Cave 1 (n = 44) and Chournos Springs (n = 11) allow some additional description of vessel form to be given (Figure 7.6). From Cave 1, 33 of the rim sherds have a flaring eversion to lips and a slight neck restriction, suggesting that the aperture of the vessel

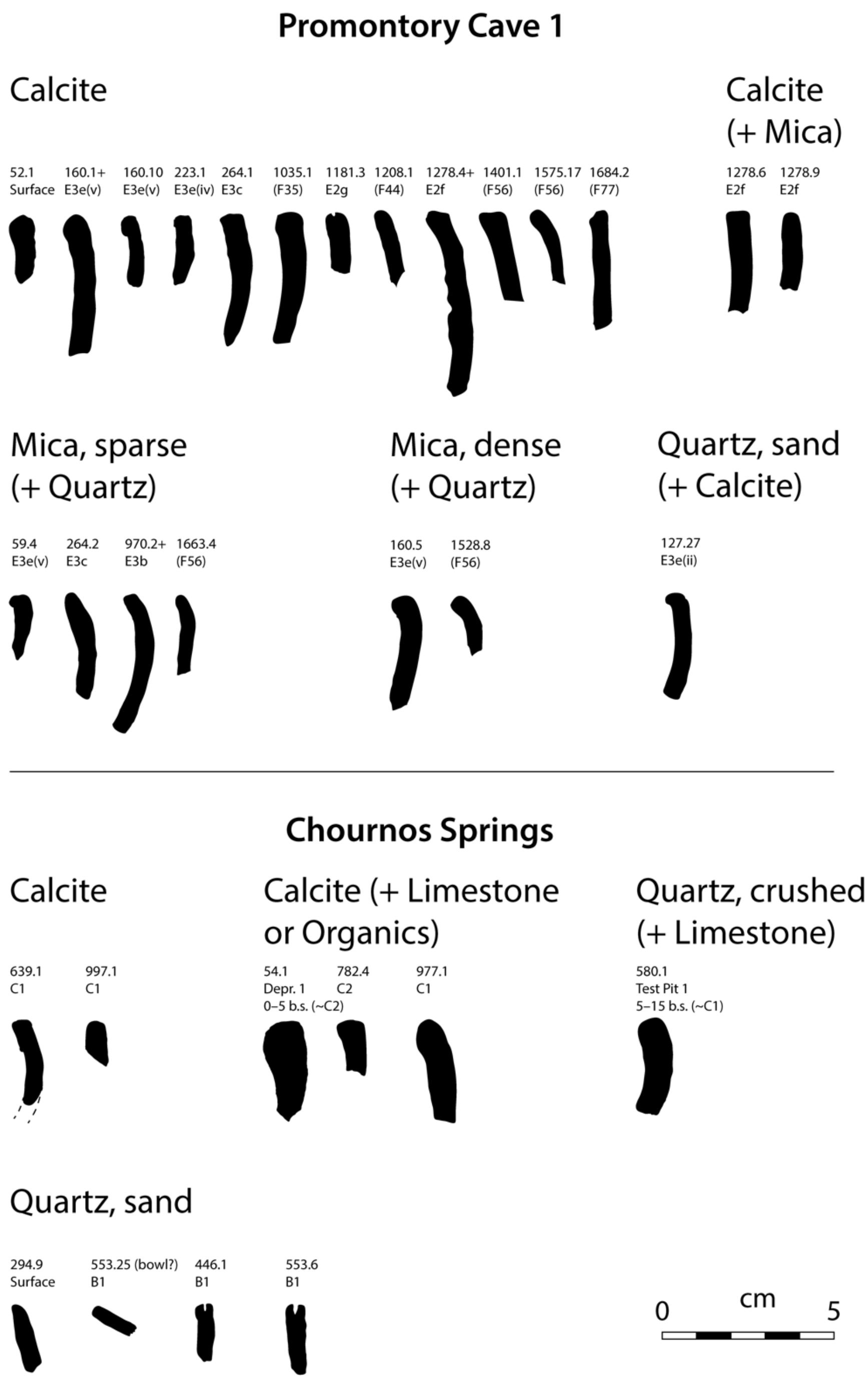

Figure 7.6. Selected rim profiles, Promontory Cave 1 and Chournos Springs.

is similar in diameter to the vessel body. The remaining 11 have straight profiles more suggestive of cylindrical or slightly expanding necks. From Chournos Springs, only 45% of the rim sherds have flaring, everted rims, but there is a difference between early and late components. Only vertical rim profiles were found with Component B (n = 2), while 75% of the sherds from Component C (n = 3) have flaring rims (the remainder were found on the surface or test excavations). While both neck shapes are known from Fremont ware, James (1986:113) has noted that vertical necks on Great Salt Lake Gray, Sevier Gray, and Snake Valley Gray (all Fremont types) "almost always have loop handles." However, no handles were recovered at either site.

Vessel size

Vessel size is difficult to determine from the present Chournos Springs specimens, owing to rim arc portions representing only 4–7% of mouth diameters. The intact rim arcs for Component B suggest large apertures of approximately 30 cm, as do two of four specimens from Component C; another Component C specimen appears to have had a very small mouth, 8 cm in diameter, while one fragment was too small to determine.

Rim sherds from Promontory Cave 1 (n = 27) were also usually too small to calculate accurate mouth diameters from (<5% rim arc diameter, following G. Smith 2004). However, four rim fragments refit to comprise 43.5% of a cylindrical-necked olla with a mouth diameter of 15 cm; three fragments represent about 18% (non-refit) of a single 18-cm-diameter vessel; two refit to comprise 5% of what appears to have been a very large (46 cm), relatively thick-walled (6.1 mm) vessel. Additionally, eight individual large rim fragments are from vessels ranging from 14-32 cm in diameter. In total, rim diameters could be calculated for 11 vessels, averaging 23 cm in diameter.

The total range of vessel sizes thus includes examples within or perhaps even exceeding the characteristically large vessels of Promontory Phase sites in Utah Valley (ca. 20–45 cm diameter; G. Smith 2004:77, 88, 105), as well as numerous examples of the smaller globular ollas typical of Fremont ware (Janetski 1994; G. Smith 2004:129).

Rim thickness and shape

Rim dimensions for Chournos Springs and Promontory Cave 1 are given in Table 7.2. At both sites, rims are, on average, slightly thicker than average wall thicknesses, both for the sites as wholes and their respective components. A slight trend is noticeable of greater rim thickening with time, from 0.6 mm greater than average wall thickness in Chournos Springs Component B to 1.2 mm at Promontory Cave 1 and 2.2 mm at Chournos Springs Component C. Despite this thickening trend, a consistent number of specimens, between 25–26% at both Cave 1 and Chournos Springs, are *thinner* at the rim than their average wall width. Tapering of direct rims is a common feature of Fremont Ware (Forsyth 1986:185), but is also evident in Steward's (1937*a*:figs. 16, 17, 19) original rim illustrations. Only one rim specimen from Chournos Springs (from a test trench) and none from Cave 1 fall in the extreme thickness ranges of 9.5–12.7 mm reported for "many" Promontory specimens by Steward (1937*a*:46) and as average for Promontory ware by

Table 7.2. Rim thicknesses, Chournos Springs and Promontory Cave 1.

Site/Component	Average Wall Thickness (mm)	No. of Measurable Rims	Average Rim Thickness (mm)	Range	No. of Tapered Specimens
Chournos Springs (Site Total)	5.1	12	6.8	3.8–12.4	3
Component B	*4.6*	*3*	*5.2*	*3.8–5.8*	*0*
Component C	*5.1*	*4*	*7.3*	*5.5–8.9*	*0*
Promontory Cave 1 (Site Total)	5.2	43	6.4	4.2–9.3	11

Rudy (1953:93); this particular discrepancy is difficult to explain.

In addition to thickening or tapering, two additional rim shape attributes were noted in these assemblages. Rims were usually rounded, but in many cases had been shaped to create a squared margin on tapered specimens and a flattened margin on thickened ones. This preparation often resulted in a more even rim profile than rounded specimens possess, although some rounded rims were also smoothed and evenly shaped. Many specimens also show a carelessly folded lip that, as described by Forsyth (1986:187), results in an irregular crease where the base of the fold meets the exterior vessel wall. Most permutations of thickening, tapering, folding, smoothing, and flattening or squaring were possible. These attributes are summarized in Table 7.3. While some combination of thickening and folding is most common at Cave 1 (n = 19), these specimens do not make up a majority of the assemblage. Notably, rim folding is absent from the Component B

Table 7.3. Rim shapes, Chournos Springs and Promontory Cave 1.

Site/Component	No. of Rims	Thickened/ Folded	Thickened/ Folded/ Flattened	Thickened/ Folded/ Smoothed	Thickened/ Flattened	Thickened/ Smoothed	Tapered/ Folded	Tapered/ Smoothed	Tapered/ Squared
Chournos Springs (Site Total)	12	3	2		2			4	1
Component B	*3*				*2*				*1*
Component C	*4*	*2*	*1*					*1*	
Promontory Cave 1 (Site Total)	44	6	11	2	9	4	1	5	6

materials at Chournos Springs, but the sample size is small (n = 3).

It should also be noted that the slight increase in rim thickness with the Cave 1 specimens often appears to be the result not of the deliberate addition of a wider band of clay to the rim or doubling the rim thickness by folding, but of the application of incised decoration to the rim (discussed in greater detail below) that caused perceptible bunching outward of the still-plastic clay at the base of each incised notch. Were it not for this metrically detectable quality, which comprises the point of maximum thickness on affected specimens, many of these characteristically decorated vessels might have had rims equal in thickness to or even slightly thinner than their respective walls.

Summary of wares

Collectively, small and large vessel diameters, restricted and unrestricted necks on globular jars, and tapered and thickened rims are consistently represented at both Chournos Springs and Cave 1. At both sites, vessel walls are consistently thin, and at neither are rim thicknesses conspicuously exaggerated, though slight trends towards thickening in both categories are evident over time. Rim folding is present in the Cave 1 and late Chournos Springs assemblages, but it should not be considered so common as to be representative. A trend towards flaring rims with slight neck restrictions is more pronounced over time, but globular ollas with vertical rim profiles suggesting more cylindrical necks are nevertheless present in some quantity at both Cave 1 and the late deposits at Chournos Springs.

The early Component B at Chournos Springs can unambiguously be assessed as Fremont Ware. While many attributes more commonly associated with Promontory Ware in Utah Valley appear at Cave 1 and at the later Chournos Springs Component C, these do not appear consistently across specimens, nor are attributes more commonly associated with Fremont Ware replaced. Instead, a progression in changes to vessel morphology seems evident. Especially when examining body sherds, one would be hard-pressed to identify individual sherds as being different wares, as, indeed, Patricia Dean (1992) did not. In terms of vessel construction, the difference between the early Chournos Springs and Promontory Cave 1 assemblages is limited to two attribute classes on this list: slight neck restrictions of globular ollas, which nevertheless also occur in Fremont types (D. Madsen 1986; R. Madsen 1977), and frequent, albeit not universal rim folding.

It is a matter of the opinion of individual analysts whether these differences are sufficient to qualify as a novel ware. When the newly revised chronology for the Promontory Cave occupations is taken into consideration, dating the Promontory people to the latter half of the 13th century AD (Ives 2017; Ives et al. 2014), differences can be recognized between early, thin ceramics at the caves and later Promontory Ware in Utah Valley with more pronounced, often cruder differences in morphology (Forsyth 1986; Janetski and Smith 2007; G. Smith 2004). The ware designation is greatly informed by chronologically later assemblages; at their earliest, while possessing emergent differences that are of some interest, the ceramics from the Cave 1 type site do appear to possess precisely what is meant by a genetic relationship with Fremont Grayware (cf. Colton and Hargrave 1937:3). While the finding that later materials are morphologically distinct from Fremont types is not disputed, it may be that the conceptual framework of a hierarchical (and fundamentally phylogenetic) classification system is not perfectly equipped to address questions of how drastically different ceramic forms can emerge. If Promontory ceramics did *not* originate primarily within the Fremont ceramic tradition, additional commonalities in other attributes, including temper, surface treatment, and decoration, as well as in use of local clay, demand further explanation.

Series: Differences in temper

Within the overarching category of the Fremont Grayware tradition, Watkins (2009) has proposed that subordinate series be designated on the basis of temper, with types in each series differentiated by surface treatment and decoration. At Chournos Springs and Promontory Cave 1, temper materials frequently occurred mixed with others (as also indicated in Figure 7.2). In order of frequency (as shown in Figures 7.4 and 7.5), the temper categories employed here are described below.

<u>Calcite</u>

Crushed, angular calcite is dominant both at Cave 1, where purely or primarily tempered specimens make up 77.5% of the material from the stratified sample and 79.5% of the assemblage as a whole. At Chournos Springs, calcite-tempered pottery makes up only 26.8% of the collected material, appearing in the pit house fill (Component B2), but being almost entirely absent on the B1 floor (n=1). Its use, especially in proportion to sand temper, increased over time: in the weakly stratified upper fill (C1 and C2) it is the most prevalent temper type (51.2%), still much lower than the frequency seen at Cave 1.

Examples of whole calcite crystals that were likely the same raw material used as temper were found in the upper fill at Chournos Springs (n = 5; Figure 7.7), Cave 1 (J.W. Ives, personal communication 2018), and at the Orbit Inn site, where it was described as "recrystallized limestone" (Simms and Heath 1990, following Dean 1992). Non-crystalline, chalky white dolomite also appears in some of the specimens from both Chournos Springs and Cave 1 (Neff 2012:5), but in the visual assessment of each sherd undertaken here, such temper fragments never appeared as the dominant material.

Figure 7.7. Calcite crystals (FS 92.1 and 310.3) from upper fill, Chournos Springs.

To many analysts, distinctive white calcium carbonate tempers are a hallmark of Promontory Gray (D. Madsen 1979*b*; R. Madsen 1977; Rudy 1953), though authors who have viewed Promontory pottery as a ware have often dedicated little attention to temper (Aikens 1966; Forsyth 1986). Here the classificatory problem of distinguishing ceramic series by temper comes to the fore, as calcite is also the near-exclusive temper type of Uinta Gray (Ambler 1966; Wormington 1955), the diagnostic ceramic of the Uinta Fremont and the sole type in Watkins's (2009) Uinta Series.

<u>Quartz</u>

Quartz tempers occur in two forms at both Chournos Springs and Cave 1. The round-grained quartz sand temper that almost completely dominates the early Chournos Springs record (Component B1), and which appears in low frequencies in the later Promontory Cave 1 deposits (Components E3a and later), is regarded by Watkins (2009:156–57) as a variant within the Great Salt Lake Series. Sand-tempered types appear more common in the vicinity of the Bear River wetlands and the northeast end of the Great Salt Lake than at locales farther south including Utah Valley (Allison 2002; D. Madsen 1979*b*; Richens 2003).

Crushed, angular quartz, often with minor amounts of mica and feldspar, occurred in lesser quantities at both sites, in both cases in intermediate or later deposits. This temper class is attributed to the Snake Valley Series by Watkins (2009:157), a cluster of types originating in southwest Utah well south of the Great Salt Lake. This is a somewhat problematic category: highly variable crushed rock tempers including quartz, feldspar, and mica have elsewhere been identified as Great Salt Lake Gray variants at sites in the Great Salt Lake wetlands and Utah Valley (e.g., D. Madsen 1979*b*; Richens 2003). Crushed quartz also appears in assemblages otherwise dominated by calcite temper on the eastern Colorado Plateau, a phenomenon Marie Wormington (1955:73) attributed to pottery makers sometimes mistakenly selecting quartz crystals for processing as temper instead of the more preferred calcite.

Mica

As with quartz, two primarily micaceous temper variants were observed at Cave 1. At both sites, specimens with low amounts of muscovite were common in low quantities, peaking in intermediate deposits. Many of these specimens possessed such trace amounts of mica, and a lack of other discernible temper particles, as to appear temperless. These low-mica ceramics have been referred to as untempered (Shepard 1964:518), "self-tempering" (Opler 1971:30–32), or "silt-tempered" (D. Madsen 1979*b*), and appear to represent Great Salt Lake variant in which the mica and other weathered rocks are residual to the clay.

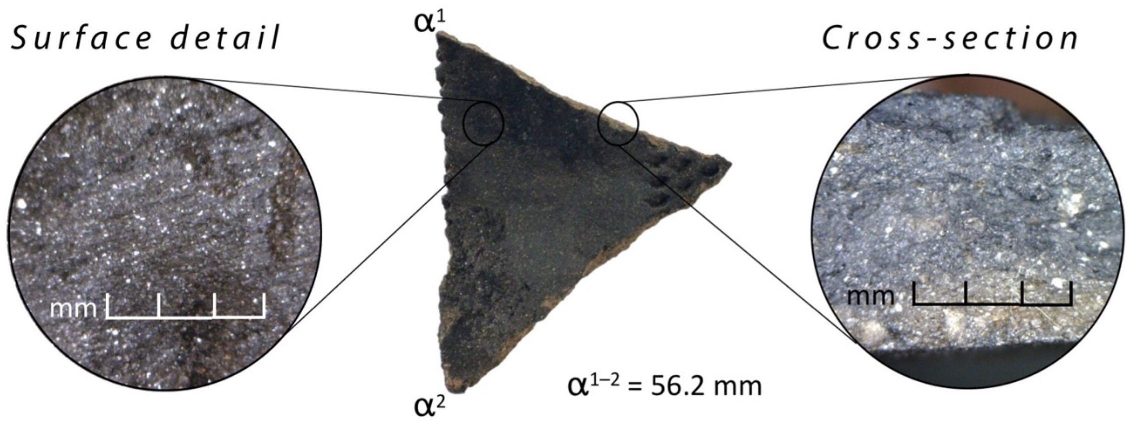

Figure 7.8. Highly micaceous, punctate-decorated sherd from Promontory Cave 1 (42BO1:1419.1). White spots are highly reflective mica temper fragments oriented directly towards light source.

Both black biotite and coppery muscovite mica are otherwise common as minor constituents in several Fremont series (Watkins 2009), but it is uncommon for mica to occur as the sole or dominant temper type. The exception is a highly micaceous variant, seen at Promontory Cave 1 but not at Chournos Springs (Figure 7.8). Instead of the mica occurring in a sparse quantity secondary to another, dominant temper type—for instance as an inclusion within pulverized quartz-mica schist or rhyolite temper—or as a trace material residual to the clay, 32 specimens from Cave 1 possess intense quantities of exclusively biotite mica, often constituting 40% of the matrix or more, generally to the exclusion of other temper types (although occasional small grains, usually of quartz sand, do occur). On the vessel exteriors, the sherds appear coated with glitter, and surface treatment consisted of scraping or burnishing which had the effect of aligning the mica grains flat to maximize reflectivity.

Although authors from Steward on have examined the Promontory ceramic assemblage without singling out the unusual nature of any highly micaceous specimens, there are good reasons to consider this as more than a trivial aspect of Promontory variability. Highly micaceous ceramics are a named ceramic type, Knolls Gray, which has a distinct geographic distribution (Figure 7.9). It was first found by Steward (1936) at Knolls, Utah, but was not classified as a separate type until Carling Malouf (1946:119, 1950:48) reported similar finds at Wendover and the Deep Creek area, on the Utah–Nevada border. Jack Rudy (1953:92–93) defined the type in greater detail, noting that so much mica was added that the paste became flaky and friable. It has also been reported at

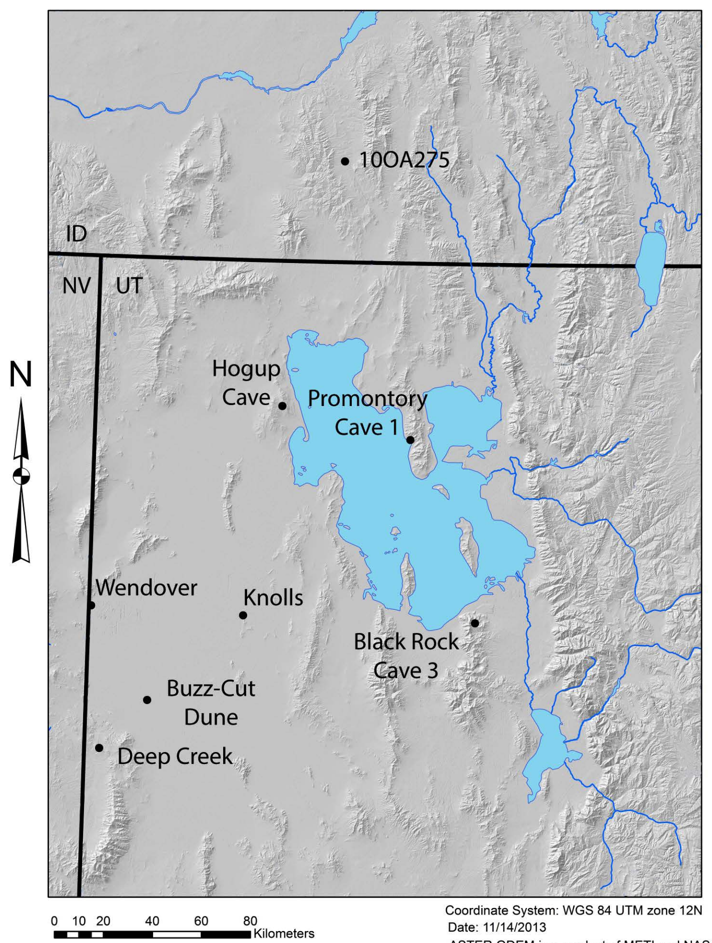

Figure 7.9. Distribution of Knolls Gray and highly micaceous specimens identified as Great Salt Lake Gray (adapted from Aikens 1970; Arkush 2014; Rudy 1953).

Black Rock Cave #3 (Enger 1942:78) and Hogup Cave (Aikens 1970) in association with both Great Salt Lake Gray and Promontory Gray.

Unlike the lesser mica-bearing variants, the highly micaceous Knolls Gray type does not appear to co-occur with other Great Salt Lake ceramics at locales such as the Bear River wetlands or in the Utah Valley; there, as at Chournos Springs, only sparsely micaceous pastes are described, and personal inspection of collections from these sites by the author identified no similar specimens to those seen at Cave 1. The intensely micaceous, seemingly glitter-coated variant is present at Hogup Cave, and more anecdotally, it appears to be common in avocational collections from the west of the Great Salt Lake (Stuart 2016). Knolls Gray may also be present at Buzz-Cut Dune (42TO1459), where use of an "almost pure, micaceous sand, probably muscovite" temper is noted in the sherds of one vessel, but varying amounts of mica in other specimens dominated by coarse quartz sand otherwise resemble Great Salt Lake Gray (D. Madsen and Schmitt 2005:105–8). Additionally, much of the mica-tempered pottery described as Great Salt Lake Gray at 10OA275, in southestern Idaho, is also highly micaceous (Brooke Arkush, personal communication, 2017).

Other tempers

Three additional temper types appear in the Promontory assemblages. Several sherds from Promontory Cave 1, probably from a single vessel, are tempered with oolitic sand: roughly spherical accretions of aragonite, each ooid visible under low magnification as a white crust around a dark core, 1.4–5.1 mm in diameter. Oolitic aragonite deposits occur as a rippled crust on the Great Salt Lake bed, each grain accreting around mineral grains or brine shrimp fecal pellets (Eardley 1938); as beach sand, it has a distribution that corresponds with algal blooms of

Aphanothece packardii, principally on shorelines on the western side of the lake including Promontory Point (Carozzi 1962). Use of this material in pottery appears to be a unique occurrence here, but the undecorated, direct, squared rim of the single represented vessel is uncharacteristic of pottery from the caves.

A shiny black basalt temper was noted in a small number of sherds (n = 4) from Chournos Springs, all with a burnished, buff-slipped exterior. The specimens correspond with comparative collection samples of Sevier Gray, a variant in the Emery Series (temper type E following Geib and Lyneis 1993; Watkins 2009:158) typical of south-central Utah. It is likely present here as a trade item.

A single specimen tempered with crushed fragments of an unidentified opaque, gray rock and lesser amounts of feldspar and mica was also recovered from Chournos Springs.

<u>Summary of temper-series</u>

The breadth of temper selection at both Chournos Springs and Promontory Cave 1 and drastic changes in usage within this microregional setting over time would indicate that this attribute is not simply a superficial property of ceramic production owed to the deterministic role of regional bedrock geology in raw material availability (cf. Dean 1992; Geib and Lyneis 1993; Madsen and Schmitt 2005:105). Dean Arnold's (1985:36) suggestion that temper use was a function of social access to raw material, with mobile hunter-gatherers having access to a greater range of sources than sedentary peoples, may come closer to explaining the variability present—an interesting point of contrast with places like Utah Valley, where there is little variability in temper. However, Wormington's (1955) notes on the lengths to which the makers of Uinta Gray went to procure calcite as a tempering agent show how some sedentary peoples would actively select more difficult-to-procure materials even when others were more readily available. Temper selection would thus appear to be attributable to some combination of local availability, social access, and perhaps most importantly, cultural preference informed by the perceived merits of one material over another.

In low frequencies, some exotically tempered pottery may, of course, have been acquired through trade. The basalt-tempered Sevier Gray and the highly micaceous pottery from Cave 1 stand out as possible candidates, but this is a testable proposition, as discussed in the paste analysis section below. It is unlikely, however, that the ubiquitous calcite-tempered pottery is exotic to this locale, whether rough and thick or thin and finely made (cf. D. Madsen 1979*b*, who considered Promontory Gray in the Bear River wetlands a trade item, but not Uinta Gray). Instead, the inversion from sand to calcite temper at Chournos Springs, the presence of calcite as a raw material there, and the sheer frequency of calcite-tempered sherds for the duration of Promontory Culture occupation at Cave 1 collectively demonstrate that a group with different temper preferences from the already resident pit house-dwelling population from the nearby wetlands arrived in the area and began making calcite-tempered pottery locally. It is possible that the cave inhabitants used one locally sourced temper material in the place of another: the spur in which the caves are located is composed of limestone, and so it is possible the highly crystalline calcite tablets from which the crushed temper is derived could have been locally obtained, but the specific raw material source is presently unknown. It seems at least equally plausible that the Promontory people arrived with a strong, preexisting preference for a raw material type that was not necessarily easy to obtain, but which they did retain social access to either through residential mobility and direct access at certain times of the year, or through persistent trading relationships with the people who obtained the material.

With a few noted exceptions for unusual or as-yet unidentified materials, the temper classes present on Promontory Point fall within the range of known Fremont ceramic variants. The quartz sand and crushed rock that Watkins (2009) attributes to types within the Great Salt Lake Series are particularly well represented. This attribution suggests a degree of indiscriminate use of locally available tempers among Great Salt Lake Fremont potters. It remains undetermined whether this variation exhibits spatial, temporal, or other patterning on a sub-regional level, although suggestions to this effect have been made. For instance, D. Madsen (1979*b*:82) tentatively offered "Bear River Brown" as a name for a primarily quartz sand-tempered Great Salt Lake variant in the Bear River area, which future work could support parsing out as a Bear River Series.

Crushed quartz with low amounts of feldspar and biotite is meanwhile a temper combination, the Snake Valley Series, that extends from the Bear River wetlands and Utah Valley to the Parowan Valley in southwest Utah (D. Madsen 1979*b*; R. Madsen 1977; Richens 2003; Watkins 2009:157). Some may have been traded, but quantities also imply local production. The choice of crushed quartz as a tempering agent seems somewhat irrational if a generalist, opportunistic use of available raw materials is argued for Great Salt Lake Fremont potters: the process of selecting, transporting, and crushing quartz-bearing rocks to a consistent size would be far more labor-intensive than selecting naturally weathered and size-sorted sand. With no mechanical differences in pottery performance seeming likely to arise from use of quartz in crushed versus sand form, an inclination toward efficiency alone would dictate sand should always have been selected, were it available, leaving a preference informed by cultural tradition as a plausible explanation for this temper selection.

On the same basis of recognizing primary temper classes as distinct series, it may be desirable to identify the highly micaceous temper variant as a separate *Knolls Series*. Even though it occurs only in low numbers at Promontory Cave 1, its presence is significant for a number of reasons. First is that it has its own geographic distribution that extends deep into the desert south and west of the Great Salt Lake, and is uncommon or even absent in the wetlands and lake margins to the east. This suggests the Promontory people interacted with hunter-gatherer populations of the desert west, beyond what many regard as the area of Fremont cultural influence (i.e., Janetski and Talbot 2014), in addition to peoples who engaged in the more familiar Fremont cycle of sedentary or semi-sedentary maize horticulture and wetland foraging.

The presence of a highly micaceous ceramic series at the margins of the Fremont world—albeit still made in a way familiar to the Fremont Grayware tradition—should also be of interest as a possible antecedent to the preferential selection of highly micaceous residual pastes in the pottery attributed to Proto-Ndee and Ndee populations on the Plains and in the Southwest, notably in Dismal River, Northern Rio Grande, and Jicarilla ceramics (Eiselt 2012; Trabert et al. 2016), and that first appeared in northern New Mexico between AD 1550–1650 (Eiselt 2005). There, researchers have noted the importance of distinguishing between mica found incidentally to the crushing of mica-bearing rock and the selection of intensely micaceous clays or additive micaceous sand so that mica became a major constituent of the vessel (Habicht-Mauche 2008:255–56; Trabert et al. 2016:365).

While mica appears to be incidentally additive or residual as a minor paste constituent in much Great Salt Lake Series pottery, it is unquestionably a major constituent of the Knolls Series specimens. The selection of clays or addition of sands with "superabundant" mica content (as much as 80 percent by volume) resulting in flaky, laminated pastes and large particles visible on surfaces (Eiselt 2005:427; Habicht-Mauche 1988:339, 405; Trabert et al. 2016:367)—conditions that closely mirror Rudy's (1953) original definition of the Knolls Gray type—should be regarded as a novel pottery-making technique within Fremont ware.

The semantics of temper-based series are most crucial when it comes to the two named types with calcite temper—Uinta Gray and Promontory Gray. The morphological differences on Promontory Point are too slight to support parsing these out as dual calcite-tempered series within two different wares (i.e., Uinta Gray within the Uinta Series of Fremont ware and Promontory Gray within a calcite-tempered series of Promontory ware). To embrace this approach would further entail the requirement that each of the other temper classes present in the Cave 1 assemblage—crushed quartz, sand, and so on—also be categorized as duplicate series within Promontory ware, with the corollary expectations that origins outside of the Fremont ceramic tradition exist and can be readily identified by the analyst. Such parallels are as cumbersome as they are unlikely: a more parsimonious explanation for the simultaneous usage of the same temper ranges at Cave 1, Chournos Springs, and indeed throughout the northern Great Salt Lake area, is that they are the product of women who shared a single ceramic tradition, and that variation in temper reflects the same community-specific preferences of the already identified series. Those inclined to split such hairs might see fit to identify different types within individual series, in which case the variously thick and thin, rough and smooth calcite-tempered pottery of the Great

Salt Lake area can be considered local variants within the Uinta Series, with all the genetic relationship that implies.

Types: Blending and distinction of other attributes

Within individual temper-based series, Watkins (2009) has proposed that types be sorted based on attributes that are primarily decorative in character. These include rim decoration, body decoration, and surface treatment. This last category, including distinctions between scraped or unscraped exteriors, undulating or regularly smoothed walls, and lustrous or non-lustrous finish, has historically been offered as evidence that Promontory pottery was made through paddle-and-anvil construction, either as a separate ware (Aikens 1966; Forsyth 1986) or as a uniquely made type within the Fremont tradition (D. Madsen 1979*b*). However, these attributes neither correspond with differences in construction technique (Dean 1992; Janetski 1994; G. Smith 2004), nor are they unique to Promontory ware (both Great Salt Lake Gray and Uinta Gray types can have undulating, rough surfaces; D. Madsen 1979*b*; R. Madsen 1977). Alternately, surface treatment is considered here as reflecting group-level differences in time investment in pottery production, for instance among mobile versus sedentary peoples (Simms et al. 1997), or among individuals who otherwise ascribed value to the quality of ceramic craftwork differently from their peers or predecessors, while still adhering to the core methods of a common tradition—that is, as possible indicators of types within a single series.

<u>Rim decoration</u>

Frequencies of decorative motifs at Chournos Springs and Cave 1 are given in Table 7.4. Distinctive rim decorations, including incised dentates and stick-impressed punctates, were seen by

Steward (1937*a*:46) as a hallmark of Promontory pottery and lacking in Fremont types (Forsyth 1986; D. Madsen 1979*b*; R. Madsen 1977; cf. Wormington 1955:68–69, who noted rare occurrences of dentates with Uinta Gray). No such dentate or punctate decoration was found among the 12 rim sherds from the early and late components at Chournos Springs, whether of sand, calcite, or other temper, but they are highly evident in the newly excavated specimens from Cave 1 (Figure 7.10). In total, 30 of the 46 new rim sherds (65.2%) from Cave 1 feature the decoration types Steward noted (quite comparable to the 64.2% he reported). The dentates, which give their rims a notched and serrated appearance, can be aligned transversely or diagonally in either or both directions, and occur both with unevenly shaped and regularly smoothed, sometimes burnished rims. They are primarily associated with calcite temper (26 of 34 calcite-tempered rim specimens), but also occur with crushed quartz (1 of 3) and sand (1 of 2). The

Table 7.4. Rim decoration, Chournos Springs and Cave 1.

	Primary temper							
Decoration type	Aragonite	Basalt	Calcite	Mica	Mica (Dense)	Opaque Rock	Quartz (Crushed)	Quartz (Sand)
Chournos Springs								
None			2					2
Burnished			2				1	2
Crenellated			1					
Grooved								2
Promontory Cave 1								
None	1							
Burnished			4	3	2		2	1
Crenellated			2					
Grooved			1					
Dentate			18				1	1
Dentate, Burnished			8					
Punctate - Rectangular			1	1				

Figure 7.10. Rim decorations, Promontory Cave 1. FS number and, where possible, component (per Figure 2.1) or other context details are given.

punctates, of which one specimen each of calcite and mica temper were found, are rectangular in shape and are set in regularly smoothed rims.

While these decoration types are absent at Chournos Springs, two rim decoration types are present there that Steward did not observe (Figure 7.11). Two sand-tempered rim sherds, both from the structure floor (B1), feature a single 1.2–1.4 mm wide groove incised perpendicularly to the top of the rim and appearing to run the circumference of the vessel, effectively bifurcating the slightly squared lip. Both sherds show a vertically oriented neck decorated with parallel rows of

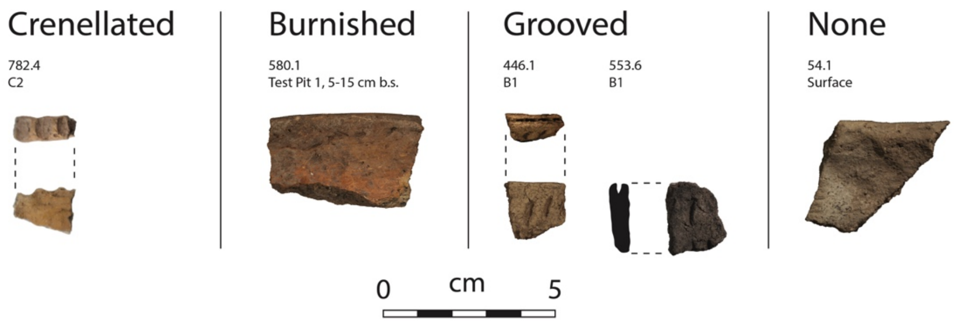

Figure 7.11. Rim decorations, Chournos Springs. FS number and, where possible, component (per Figure 7.2) or other context details are given.

thumbnail punctates up to the edge of the rim, but the punctates are of sufficiently different size, depth, and orientation to suggest the sherds are from different vessels. One similar fragment is known from the Fremont-affiliated Kay's Cabin site southwest of Utah Lake (G. Smith 2004:132).

The other decoration style was found on a sherd with mixed calcite and dolomite temper from the uppermost fill (C2), was formed by impressing the side of a round tube-shaped object such as a small bone or reed against the top of a smoothed, well-shaped, thickened rim to create a series of regularly spaced, transverse, U-shaped crenellations 5.7 mm across and 1.1 mm deep. This decorative motif effectively combines both the regularly stamped nature of the punctates and the transverse alignment of the dentates otherwise seen in the Cave 1 assemblage. Significantly, both a grooved, bifurcated rim sherd and two crenellated rim sherds were found at Cave 1, both from calcite-tempered vessels; unlike at Chournos Springs, the grooved specimen does not feature thumbnail punctates on the neck.

Combining these unusual decorative forms with the motifs noted by Steward, rim decoration is unquestionably more frequent at Cave 1 (33 of 46 sherds, 71.7%) than at Chournos Springs (3 of 12, 25.0%). The overall proportion of decorated rims at both sites, though, may yet be higher. Rim burnishing, resulting in a more visible lustre on the upper margin of the rim than is usually seen on the exterior or interior walls of these vessels, as well as a very finely smoothed profile, is also quite common across most temper types (n = 5 at Chournos Springs, n = 20 at Cave 1, including 8 with transverse dentates). If counted as a decorative style (it may also be considered an aspect of finish), then 66.7% of the rim sherds from Chournos Springs exhibit decoration, as do 97.8% of the rim sherds from Cave 1, the sole exception being tempered with oolitic sand. These last figures are not strictly comparable to results from other sites, however, where rim burnishing is not commonly discussed separately from overall surface treatment.

Body decoration

There is a sharp contrast in the use of body decoration between Chournos Springs and Cave 1 (Table 7.5, Figures 7.12 and 7.13). In both the upper and lower components, the sand-tempered pottery at Chournos Springs is often decorated, with close-set, parallel, laterally oriented, and sometimes converging incised lines (n = 39), evenly spaced rows of thumbnail-impressed dentates (n = 19), or sometimes both (with dentates around the neck and incised lines on the shoulders, n = 5) being most common. In total, 33.8% of the sand-tempered sherds feature some form of decoration; most appears restricted to shoulder and neck fragments (i.e., the upper half to third of globular ollas), which may suggest that, as a whole, the great majority of such vessels were decorated at least in part. In contrast, the calcite-tempered pottery there features very little body decoration (2.1%): one sherd featured a single deeply incised line and one features a row of four small (1.7–2.2 mm) rectangular punctates.

At Cave 1, the situation is somewhat reversed. No decorative motifs appear on the sand-

Table 7.5. Body decoration, Chournos Springs and Cave 1.

	Primary temper							
Decoration type	Aragonite	Basalt	Calcite	Mica	Mica, Dense	Opaque Rock	Qtz., Crushed	Qtz., Sand
Chournos Springs								
None		4	89	15		1	22	133
Appliqué				2				
Incised Line, Single			1					1
Incised Lines, Parallel								39
Paint, Black on Gray							2	
Punctates, Circular				8				1
Punctates, Circular, & Line, Single								1
Punctates, Kernel								1
Punctates, Small Rectangular			1					
Punctates, Thumbnail							1	19
Punctates, Thumbnail, & Lines, Parallel								5
Promontory Cave 1								
None	21		484	44	31		18	14
Incised Line, Single			2					
Incised Lines, Diamond			3					
Incised Lines, Parallel			2					
Punctates, Circular and Small Rectangular			1					
Punctates, D-shaped					1			
Punctates, Small Rectangular			1					
Punctates, Thumbnail			12					

tempered specimens, while the calcite-tempered pottery features greater numbers of body-decorated sherds (albeit still rarely, 4.2%; n = 21). In the majority of cases, these include the same motifs as appear on the *sand*-tempered pottery at Chournos Springs—thumbnail dentates (n = 12) and parallel incised lines (n = 2)—in addition to the deeply incised single line (n = 2) and small rectangular punctate (n = 1) motifs seen there on the calcite-tempered pottery.

These represent a seeming transference of motifs across temper variants between the sites; other examples include circular-stamped punctates, probably impressed with the tube-like cut end

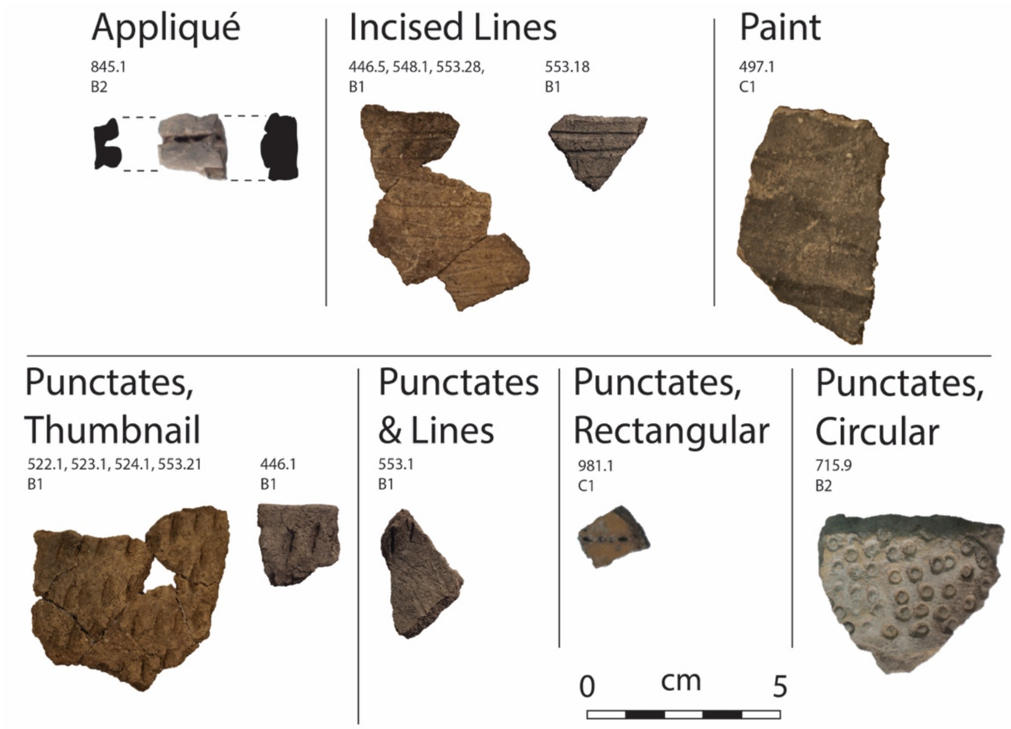

Figure 7.12. Selected surface-decorated sherds, Chournos Springs. FS number and, where possible, component or other context details are given.

of a bird bone or reed, which are found with 10 very sparsely mica and sand-tempered specimens from Chournos Springs and on one calcite-tempered sherd at Cave 1. This motif is only rarely reported, known from a single Promontory Gray sherd at the Levee site (D. Madsen 1979*b*:93, fig. 63, *a*) and an Emery Gray sherd illustrated by R. Madsen (1977:fig. 27, *e*).

Additional rare instances of decoration with the principal temper classes also occur. Three calcite-tempered shoulder sherds from Cave 1 bear a pattern of very shallowly incised diamond-shaped lines or exes; the vertically oriented lines trail off at the lower end of the shoulder and are concentrated towards the neck. No analogues are known from the Great Basin, but a closely corresponding specimen where the trailing decoration forms crisscrossed exes on the shoulder has been found at the Elk Mountain site in Carbon County, south-central Wyoming (Jody Clauter, pers. comm., 2015).

From Chournos Springs, a small sand-tempered fragment entirely covered with close-set rows of kernel-shaped indentations (not pictured) appears to be unique.

Only a few examples of decoration were observed with specimens of the other tempers. Rows of tiny rectangular or D-shaped punctates, perhaps made with the end of a split stick and having a similar effect on fracture lines to the holes in perforated paper, were observed on one of the highly micaceous specimens from Cave 1 (FS 1419.1). This is the only body-decorated specimen that is not calcite-tempered at that site, although similar punctates are illustrated by R. Madsen for Promontory Gray (1977:fig. 21, *b*, *c*).

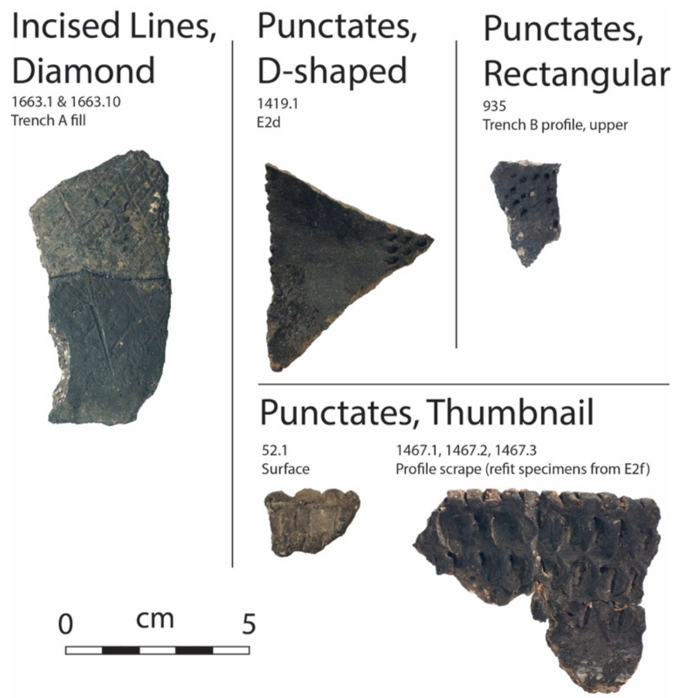

Figure 7.13. Selected surface-decorated sherds, Cave 1.

Based on a single specimen, flattened oval appliqué pellets with an incised longitudinal groove, sometimes referred to as coffee-bean shaped, were associated by Steward (1937*a*:48, fig. 19, *f*) with Promontory ware. Coffee-bean appliqués are a relatively common motif in all except painted Fremont variants, however, including in Great Salt Lake Gray and Uinta Gray from the Bear River wetlands (D. Madsen 1979*b*:89; R. Madsen 1977). No additional specimens were observed in the latest Cave 1 assemblage, but two vaguely coffee bean-like specimens were found at

Chournos Springs, probably from the same vessel, with both featuring trace amounts of mica and other materials residual to the clay (i.e., "silt-tempered" following D. Madsen 1979*b*).

Finally, two crushed quartz-tempered fragments from Chournos Springs with very finely smoothed dark gray surfaces exhibit what appear to be portions of thick, black, carbon-painted lines on their incurving interior surfaces. Though the contrast in tones is slight and the pieces too fragmentary for a pattern to be identified, these appear to be fragments of painted bowls, usually referred to as Snake Valley Black-on-Gray (D. Madsen 1979*b*:83; R. Madsen 1977:5–6; Rudy 1953:90).

<u>Surface treatment</u>

While the uneven surfaces associated with Promontory pottery have widely been interpreted either as a sign of hand-molding (Rudy 1953) or paddle-and-anvil construction (Aikens 1966; D. Madsen 1979*b*; R. Madsen 1977; Forsyth 1986), only a minority of sherds from Chournos Springs (13.9%) and Cave 1 (45.9%) have undulating surfaces (Table 7.6). This is overwhelmingly the case for the sand-tempered pottery that dominates the early component at Chournos Springs (5.2%), though the proportion does increase for the calcite-tempered pottery at that site (27.7%) and at Cave 1 (47.5%). Thus while Steward's (1936) observation statistically holds true that the pottery from the caves is "rougher" than that seen at lakeside pit house sites, it would not be accurate to characterize the Promontory pottery assemblage as inherently rough. Most is finely smoothed.

The Cave 1 pottery is better characterized by the presence of horizontally oriented scrape marks on vessel exteriors, which occur both with smoothed and undulating walls and often result

Table 7.6. Exterior surface treatment, Chournos Springs and Cave 1 (exfoliated specimens excluded).

Primary Temper	**Undulating**			**Total**	**Smooth**			**Total**	**%**
	Reg.	Scr.	Burn.	**Undul.**	Reg.	Scr.	Burn.	**Smooth**	**Undul.**
Chournos Springs									
Basalt	-	-	-	**0**	-	-	5	**5**	0.0
Calcite	9	14	-	**23**	12	46	2	**60**	27.7
Mica	3	1	-	**4**	9	12	-	**21**	16.0
Quartz (Crushed)	5	4	-	**9**	9	7	-	**16**	36.0
Quartz (Sand)	10	-	-	**10**	124	56	3	**183**	5.2
Other	-	-	-	**0**	-	1	-	**1**	0.0
Promontory Cave 1									
Aragonite	-	8	-	**8**	-	13	-	**13**	38.1
Calcite	27	207	-	**234**	12	235	12	**259**	47.5
Mica (Low)	-	16	1	**17**	-	23	4	**27**	38.6
Mica (Dense)	-	9	-	**9**	-	8	15	**23**	28.1
Quartz (Crushed)	2	7	-	**9**	2	6	-	**8**	52.9
Quartz (Sand)	3	5	-	**8**	-	6	-	**6**	57.1

in a somewhat lustrous finish (noted for 71.7% of all specimens, and never with specimens where scrape marks were not evident). The vast majority of the calcite-tempered pottery from Cave 1 (89.7%) is scraped, while an additional 2.4% is burnished, distinguished from scraping by the appearance of multiple overlapping striations resulting in a very high lustre (and thus denoting that scraping, when present, often appears more cursory). Scraping and burnishing sometimes have a noteworthy pattern when occurring in combination with undulating surfaces, being present on the crests and bypassing recessed troughs or divots.

The calcite-tempered pottery at Chournos Springs is, in broad terms, finished similarly to Cave 1, but plain surfaces are more common, only 65.1% being scraped or, rarely (n = 2), burnished. Despite their smoothed surfaces, scrape marks are even less commonly visible with the highly decorated, sand-tempered pottery there, occurring with only 30.6% of all specimens.

The sand-tempered specimens from Cave 1 do not conform to the patterns seen at Chournos Springs. These, together with the crushed quartz specimens, are the only subsets of either assemblage that are predominantly undulating rather than smooth-surfaced (57.1% and 52.9%, respectively), while scraping is prevalent with both (76.5% and 78.6%). The highly micaceous specimens at Cave 1, which also can have both undulating and smooth surfaces, are very commonly burnished (46.9%), with the remainder being scraped and highly lustrous. Scraping or burnishing of the highly micaceous pottery had the added effect of aligning surface mica particles flat, enhancing their glitter-like effect. The aragonite-tempered object from Cave 1, which appears to have had both undulating (n = 8) and smooth sections (n = 13), bears no indication of sophisticated surface treatment.

Of final note, the basalt-tempered sherds at Chournos Springs possess a thin, buff-colored slip on their exterior surface that contrasts with their gray cores and is visible in cross-section microscopy. This exterior was burnished to a high gloss, with corners of the crushed black temper slightly protruding from the surface. While distinct, this surface treatment is not entirely unique at Chournos Springs. A similarly contrasting buff-slipped/grey-cored combination is visible on three primarily quartz-tempered sherds, although these lack any comparable lustre. Curiously, while it might be suggested that this surface treatment is imitative, it does not appear to have been intended to look like the basalt-tempered type. Rather, microscopic cross-section examination shows that, unlike the tempering material visible in the cores, very small particles of white calcite are visible poking through the exterior surfaces, which were applied mixed within the thin (0.4 mm) slip.

Summary of types

While the derivation of a new ceramic typology is not the goal of this work, there is nevertheless sufficient non-uniformity within individual temper-series at Chournos Springs and Cave 1 to suggest that distinct types were manufactured. The highly decorated, sand-tempered variant that so dominates the Component B assemblage at Chournos Springs is substantively different from the silt- and other rock-tempered ceramics that might also be designated within a common Great Salt Lake Series, and from the sand-tempered specimens which appear later at Cave 1, which are thicker, rougher-surfaced, and lack body decoration. Representing the baseline ceramic type for the earliest sedentary or semi-sedentary occupants of the Promontory locale, the term "Great Salt Lake Gray" seems inadequate as a descriptor for the decorated variant, the term being used elsewhere as a catch-all that encompasses substantial variation, both in decoration and temper. Additional consideration is merited for the other, primarily mica-tempered ceramics that, following current typological convention, also fall within the range of variation for the Great Salt Lake Series. Undecorated, sparsely micaceous specimens may be lumped within the range of variation for Great Salt Lake Gray, but a circular-punched, very sparsely micaceous and possibly self-tempered variant from Chournos Springs appears distinct both from the micaceous specimens and the decorated, sand-tempered pottery. It is reasonable to distinguish at minimum between various Great Salt Lake decorated and plain (i.e., Gray) types, but with correspondences noted between decoration and temper, additional work remains to be done in characterizing variability within Great Salt Lake Fremont ceramics.

The highly micaceous pottery at Cave 1 is a clear outlier from the bulk of material in either assemblage. The combination of distinctive form (flattened, folded lips), finish (extensive rim and body burnishing), and deliberate use of highly micaceous sand above and beyond the use of clays where trace amounts of mica were residual to the paste, generally to the exclusion of crushed rock or quartz sand temper, provides ample grounds for distinguishing Knolls Gray and its concomitant parent Knolls Series from other ceramics of the Great Salt Lake area.

The occurrence of two specimens of black-on-gray paint in sole association with crushed quartz temper meanwhile supports the identification of Snake Valley Black-on-Gray, and by extension the plain crushed-quartz pottery as Snake Valley Gray. The implausible interchangeability of sand and crushed quartz among Great Salt Lake Fremont potters has been noted previously.

The calcite-tempered pottery from the upper deposits at Chournos Springs, appearing intermediate between the thin, well-made specimens in the Cave 1 assemblage and later forms in Utah Valley, is difficult to reconcile with published descriptions of ceramic types. Though the calcite-tempered material from Cave 1 is familiar from Steward's description, it is also typologically problematic. Using David Madsen's (1979*b*:81) definition of Uinta Gray as a guide (largely adapted from Rudy 1953 and Wormington 1955), 13 specimens from Cave 1 match the following parameters: angular, crushed calcite temper; surfaces ranging from rough and undulating to smooth and scraped, "but not polished"; incised rim decoration; light to dark gray exteriors and light gray to buff interiors; and thicknesses from 3–8 mm. In contrast, 174 specimens match Madsen's parameters for Promontory Gray, including crushed calcite, sand, or mica temper; undulating, occasionally scraped or burnished surfaces; black, dark buff or dark gray exteriors; rims 9–12 mm thick; and walls 3–9 mm thick. Problematically, seven individual sherds match the parameters for both types, while neither category incorporates a majority of the 472 calcite-tempered sherds at the cave. The even smoothness of most, and thin rims of many, exclude them from consideration as Promontory Gray, while only their predominantly black color excludes them from consideration as Uinta Gray.

The inadequacy of a typological classification that excludes the majority of materials from its type site is, of course, self-evident. Steward's original definition of the Promontory ceramics as a ware is not supported by the data (following the parameters established by Colton and Hargrave 1937 and Watkins 2009), and the diversity of tempers at Cave 1 is too broad to represent a single series or type. I instead suggest that the definition of Promontory Gray, as a type within the Uinta Series of Fremont Ware, be revised to represent the calcite-tempered pottery from Cave 1. This is thin (averaging 5.2 mm, and only very rarely exceeding 8 mm); is primarily black but includes buff, gray, and even reddened specimens; possesses rims which can be rounded or squared, tapered or thickened, and even or uneven; is very often decorated, especially with distinctive serrations or crenellations along the rim; and possesses a balanced range of both undulating and regularly smoothed exterior surfaces that can be hand-shaped, scraped, or even burnished. On the whole, this assemblage seems a much closer fit to earlier Fremont pottery from the Uinta Basin, where black is in fact a well-attested color (R. Lister 1951:31; Lowie 1924:225–26) than to Promontory Ware in the vicinity of Utah Lake, where calcite temper, smooth surfaces, thin walls, and tapered rims are not found, but the calcite-tempered pottery from the upper levels at Chournos Springs is suggestive of a gradual transition to this later form.

It may not be prudent to further subdivide the Promontory pottery assemblages into types based on their degree of surface treatment and overall quality of construction. Insofar as etically defined types are intended to reflect the emically constituted knowledge of communities of potters, some variation should be expected in this regard, reflecting both the investment of time spent making vessels and the competency or training of individual craftswomen. Assuming that not all potters possessed equal skill, and that some vessels may have been made for more expedient purposes than others, then such attributes as thickness, surface undulations, and rim evenness should possess a certain range of variation within a given population, rendering them a weak basis for distinguishing ceramic types. Rather than considering thin, well finished vessels Uinta Gray, for instance, and thick, crudely finished vessels Promontory Gray, one may simply be witnessing the breadth of well-made and poorly or expediently made specimens of a single type. It is of considerable interest, however, when such patterns consistently change over time, as appears to have been the case with pottery throughout the region in the Late Prehistoric period (Forsyth 1986; Janetski and Smith 2007; G. Smith 2004; Simms et al. 1997).

Paste analysis

Additional insight into the knowledge shared by potters on Promontory Point and northern Great Salt Lake comes from the LA-ICP-MS analysis of paste samples. In an initial evaluation (Neff 2012), all 17 samples from Cave 1 were found to belong to the same "Main Promontory" paste group, based on commonalities in rubidium, zinc, and uranium concentrations (Figures 7.14 and 7.15), suggesting manufacture from the same clay procurement zone. Additionally, three of four specimens from Cave 2, and three of five from Chournos Springs were found to belong to this same paste-compositional group. The remaining three sherds shared sufficient similarity to be grouped as a single "Secondary Promontory" paste-compositional group,

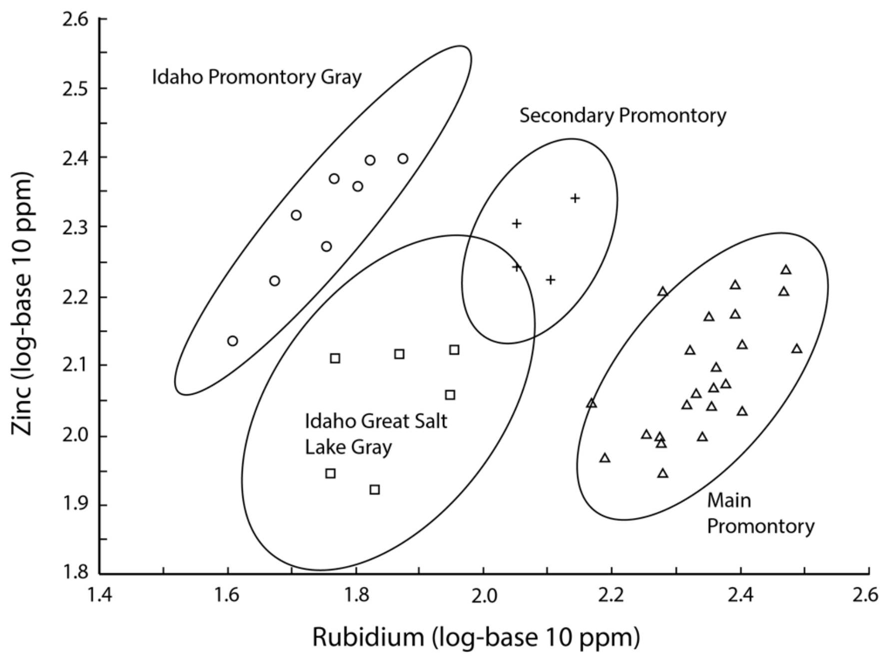

Figure 7.14. Bivariate plot of average rubidium and zinc concentrations for sherds from Promontory Caves 1 and 2, Chournos Springs, and 10OA275. Ellipses show 90% confidence level for paste group membership. For discussion of Idaho specimens, see Arkush, in prep.; figure redrawn from Neff 2012.

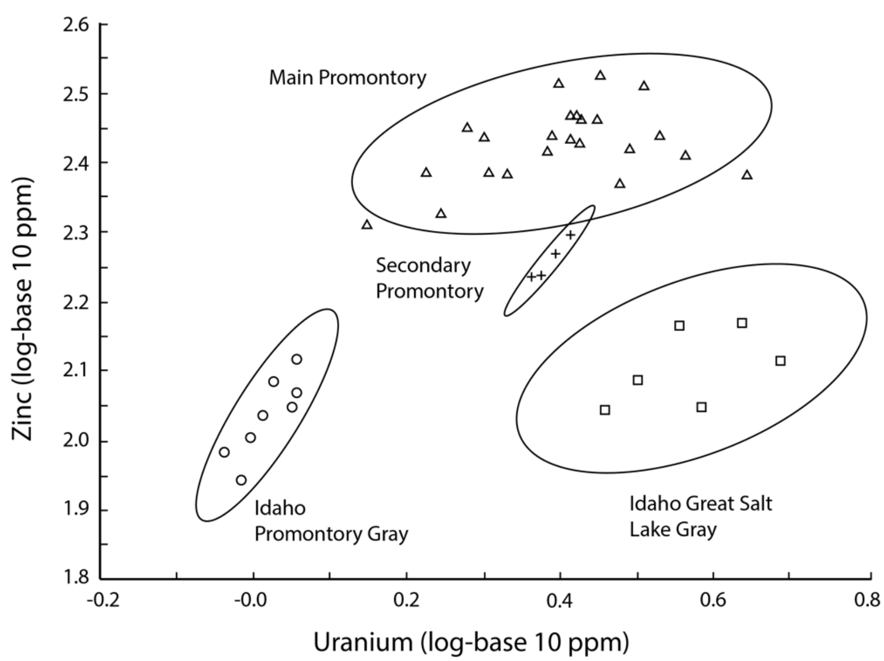

Figure 7.15. Bivariate plot of average zinc and uranium concentrations for sherds from Promontory Caves 1 and 2, Chournos Springs, and 10OA275. Ellipses show 90% confidence level for paste group membership. For discussion of Idaho specimens, see Arkush, in prep.; figure redrawn from Neff 2012.

which also corresponded with a sherd of unclassified type provided by Brooke Arkush from site 10OA275 in the Curlew National Grasslands, Idaho. Other sherds from that site showed consistent use of different clay between specimens typed as Promontory Gray and Great Salt Lake Gray (Arkush, in prep.).

The Main paste group that so dominated the Cave 1 sample consisted primarily of calcite- and dolomite-tempered specimens, but also included specimens with non-carbonate temper. The Secondary paste group was comprised solely of non-calcium carbonate tempers, except for a single calcite particle observed in one sherd from Chournos Springs. At Cave 1, then, despite potters having had different ideas in terms of temper selection and style, individuals accessed the same, probably local clay source. Shared knowledge of local clay source zones appears to have existed between the people at Cave 1, Cave 2, and Chournos Springs, but at both the latter sites, residents utilized an additional (Secondary) clay source that the Cave 1 residents did not.

In a second round of testing with an expanded batch of samples, Neff (2013) differentiated two variants within the Main paste group based on base-10-logged calcium concentrations (High-Ca variant: 4.8 ± 5 ppm, Low-Ca variant: 3.8 ± 4 ppm at 90% confidence interval). While calcium enrichment could result from the diffusion of ions from temper particles into the surrounding paste matrix, at least eight High-Ca paste specimens in this and subsequent analyses were *not* tempered with calcium carbonate. These variants therefore appear to be two closely similar clays, one slightly more calcareous than the other. Two additional specimens from the second round of testing (one each from Cave 1 and Chournos Springs) could not be assigned to the High-Ca or Low-Ca variants of the Main paste group or to the Secondary paste group seen at Chournos Springs and Cave 2, suggesting some procurement of items not locally manufactured.

The third batch of samples submitted for LA-ICP-MS analysis included a broader range of non-calcium carbonate tempered specimens from Chournos Springs. Continuity in use of the High-Ca paste on Promontory Point was confirmed, appearing in both sand-tempered sherds from Component B and calcite-tempered sherds from Component C (Hector Neff, pers. comm., 2015).

This final batch also included 24 specimens from the Natural History Museum of Utah (NHMU) collections that have previously been identified as Promontory Gray, Promontory Punched, Uinta Gray, Great Salt Lake Gray, and Knolls Gray (as evidenced by bag labels and sorting in the museum's reference collection). These specimens, from sites 42BO36 (Hogup Cave), 42BO57 (Bear River 2), 42BO98 (Bear River 3), 42BO107 (Levee), and 42WB34 (Injun Creek), were originally reported by Aikens (1966, 1967*a*, 1970) and D. Madsen (1979*b*), and were reanalyzed by Forsyth (1986). With the exception of Bear River 3 (from which only a single sherd was tested), paste analysis of these specimens showed consistent use of each of the paste groups identified from the sites on Promontory Point (summarized in Table 7.7). Six of 13 specimens from Bear River 2 were of the High-Ca paste type, five of them calcite-tempered and typed as Promontory Gray. All four specimens from the Levee Site were made from the High-Ca paste variant, including one specimen that had previously been identified as Uinta Gray. Both specimens selected by the author as representative samples of Great Salt Lake Gray from the Injun Creek site were also of familiar paste groups (one each of the Low-Ca and Secondary paste groups), as were two of three specimens selected from the Hogup Cave collections (a Knolls Gray specimen with Low-Ca paste and a Great Salt Lake Gray specimen with Secondary paste).

It seems probable that the laser ablation results reported here, although of a preliminary nature, have successfully identified at least one paste type—the High-Ca variant—that is from a

Table 7.7. Comparison of paste groups and primary temper types from sites in the northern Great Salt Lake area (LA-ICP-MS results from Neff, personal communication 2015).

Site	High-Ca Promontory	Low-Ca Promontory	Secondary Promontory	Idaho GSL Gray	Idaho Prom. Gray	Unassigned	Total
10OA275 (Curlew Ntl. Grassland)			1	6	21	2	30
Bear River 2 (42BO57)	6		2			5	13
Calcite	*5*					*2*	*7*
Limestone						*1*	*1*
Quartz, crushed	*1*		*2*				*3*
Quartz, sand						*2*	*2*
Bear River 3 (42BO98)						1	1
Quartz, sand						*1*	*1*
Chournos Springs (42BO1915)	17		2			2	21
Calcite	*7*						*7*
Quartz, crushed	*2*						*2*
Quartz, sand	*6*		*2*			*1*	*9*
*Undetermined**	*2*					*1*	*3*
Hogup Cave (42BO36)		1	1			2	4
Mica						*1*	*1*
Mica, dense		*1*					*1*
Quartz, sand			*1*			*1*	*2*
Injun Creek (42WB34)		1	1				2
Mica			*1*				*1*
Quartz, crushed		*1*					*1*
Levee (42BO107)	4						4
Calcite	*3*						*3*
Quartz, crushed	*1*						*1*
Promontory Cave 1 (42BO1)	22	12				1	35
Calcite	*12*	*3*					*15*
Mica	*1*						*1*
Quartz, crushed		*1*					*1*
*Undetermined**	*9*	*8*				*1*	*18*
Promontory Cave 2 (42BO2)	8		1				9
Calcite	*3*		*1*				*4*
Quartz, crushed	*1*						*1*
*Undetermined**	*4*						*4*
Total	**57**	**14**	**8**	**6**	**21**	**13**	**119**

** A number of sherds from BO1, BO2, and BO1915 submitted for paste analysis in late 2011 were sent prior to cataloguing and have not been relocated.*

source zone local to both Promontory Point and the Bear River wetlands, that was used continuously through the late Fremont era and into the Late Prehistoric, and that was particularly favored by Promontory-affiliated potters. Use of this clay may reflect the social and political ties available to the Promontory people as they came in contact with more sedentary groups familiar with source procurement zones (cf. Eiselt 2005:55). The Low-Ca variant is probably also a local material, at least within the vicinity of the northern Great Salt Lake, but the occurrence of single specimens at the two sites furthest from one another in this study (Hogup Cave and Injun Creek) does not aid in narrowing down a source area. Greater sampling is strongly recommended to better establish the proportionality of these and other temper variants in the collections cursorily examined here, to home in on potential source areas, and to better assess the frequency of other pastes that are presently unassigned to groups. The Secondary paste group discussed here is probably one of several clays that were known and utilized by some, but not all of the area's inhabitants, reflecting the relatively limited access to clays expected of sedentary groups in comparison to mobile hunter-gatherers (Arnold 1985:36; Janetski 1998; Simms et al. 1997), but the scope of the sampling so far undertaken is not adequate to address this question.

While specimens previously typed as Uinta Gray were of variable pastes (one High-Ca and two unclassified), there was remarkable consistency in specimens labelled as Promontory Gray being of the High-Ca paste group. Use of this paste does not appear to have been restricted to the production of calcite-tempered pottery, nor to Promontory-affiliated peoples. No other relationship is evident in this limited data set between temper and paste: temper use does not appear to have been tethered to what was locally available in the same sense as clay, and temper materials such as micaceous sand (as seen in the Knolls Gray at Cave 1 and Hogup Cave) and calcite crystals (found whole at Chournos Springs and Orbit Inn) may have been transported some distance and perhaps even traded for.

The possibility that the preferred paste used in Promontory-attributed ceramics was inherently calcareous is an intriguing one, as calcium-enriched clay usually fires black (P. Rice 1987:333–45). This blackness of Promontory Gray may simply be a byproduct of the use of a locally sourced clay by potters otherwise following a socially learned template for Uinta Gray.

Discussion

For the analyst interested in classifying assemblages according to typological categories, the observations stated here present a quandary. To the question of whether a sherd from any given site is, for instance, either Promontory Gray, Uinta Gray, or Great Salt Lake Gray, I can offer little satisfaction except to note that the ambiguities inherent to the ceramics from Cave 1—the Promontory type site—and nearby Chournos Springs are of considerable interpretive value. For it is not the intent of this discussion to redefine ceramic types; of interest here is the identity of the women who made these assemblages and the relationships among them. While these relationships may confound easy typological assessment, they offer insight into culture-historical questions about the origins of the Promontory ceramic tradition, the prevalence of sociodemographic mobility in the terminal Fremont era, and the ethnogenetic processes the Promontory people underwent through their association with Fremont-affiliated groups.

Culture contact on Promontory Point

Although Julian Steward's (1937*a*) initial report of the ceramics from the Promontory Caves acknowledged a diversity of tempers at Cave 1, he did not identify any associated variability in vessel forms, surface treatment, or decoration beyond the presence of a single "Puebloan" sherd. His enduring suggestion that the cave assemblage is monotypic would yield the expectation, according to the model of expected patterns of social interaction and material culture presented in Chapter 4 (see Figure 4.2), that the Promontory people were an insular, contact-averse group. On closer examination, this is demonstrably not the case. Considerable diversity is present within the ceramic assemblage, and the nature of that diversity takes on a different character at different times (Figure 7.4). Despite this variability, the Cave 1 pottery was produced with what were, to varying degrees, locally available clays. In sum, the stratigraphically ordered ceramic sequence offers the suggestion of a single resident population whose members expressed differing preferences in crafting similar, but not identical pottery. Influences from a number of Fremont ceramic series are represented in Cave 1 (Uinta, Knolls, Great Salt Lake, and Snake Valley), and the number of influences grew over time.

When the tight integration of stylistic characteristics—rim shapes, surface treatment, and decoration—is factored into consideration, cross-type attribute-level blending appears to have been extensive. Exemplary of the emergent, blended forms is the very extensive rim refit shown in Figure 7.16. The vessel had both a serrated rim (an attribute typical of Promontory Gray) and rows of deep thumbnail punctates (typical of Great Salt Lake Gray). It is black and calcite-tempered (typical of both Promontory and Uinta Gray), but it lacks a thickened rim or pronounced lip. It also has a long, slightly flaring or cylindrical neck and, at the edges of the refit, the beginnings of a well-defined restriction at the neck/shoulder junction; the suggested shape is one wider at the shoulders than the rim and more typical of Fremont than Promontory ware. While this is but one example, specimens such as this fit the pattern predicted by Ives (1990) for an exogamous group

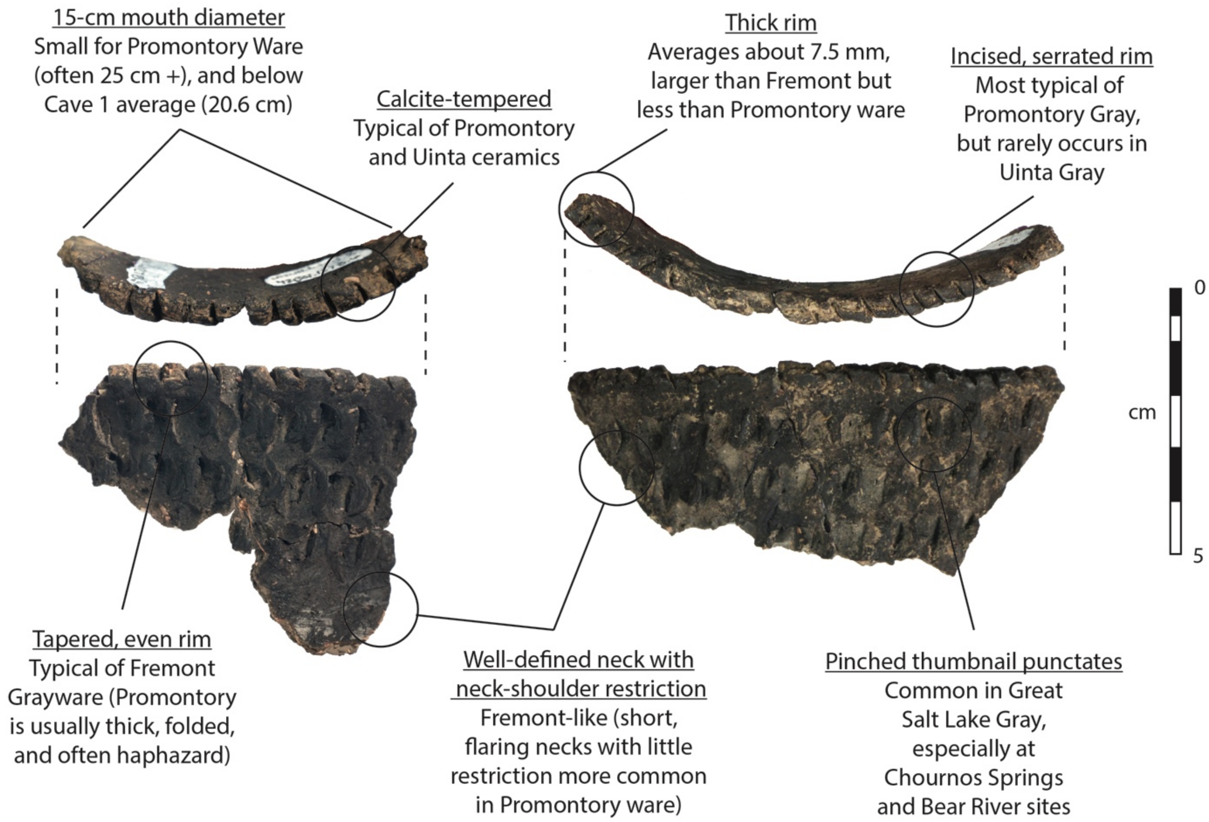

Figure 7.16. Refit of a calcite-tempered vessel from Promontory Cave 1 showing attributes that can variously be attributed to Promontory Gray, Uinta Gray, and Great Salt Lake Gray, or more generally, Promontory ware and Fremont ware.

with a high affinity for intergroup contact and in which the blurring of stylistic forms may reflect processes of social recruitment and ethnogenetic change.

Elements of the assemblages at both Cave 1 and Chournos Springs are unusual compared to other sites. The preponderance of serrated and other decorated rims at Cave 1 and of dentate and incised body decoration at Chournos Springs are exemplary in this regard. While in one sense this may reflect drift-like processes of stylistic divergence over time from a parent tradition (as, for instance, of a more highly decorated Promontory Gray type within the Uinta Series), the accentuation of stylistic details may also reflect contemporaries in close proximity attempting to set themselves apart from their neighbors (Hodder 1982). Elements of both decoration and surface treatment often appear not to be restricted to any individual temper class. That these stylistic variances are the product of relational processes and not mere phylogenetic drift is indicated by the fluidity with which motifs are dispersed across the geographic and social boundaries that can be inferred from series and type.

Origins of the Promontory ceramic tradition

One question that can immediately be addressed from these varied assemblages is whether the Promontory ceramic tradition might in fact have emerged from the local Great Salt Lake Fremont tradition. The answer is, definitively, no. Prior to the mid-13th century, when peak occupation of the caves began, a highly decorated type of thin, exclusively sand-tempered Great Salt Lake Series pottery was being produced at Chournos Springs. The stratified deposits from Cave 1 stand in stark contrast to this baseline for local ceramic production. With the initial appearance of the Promontory people in Cave 1 (Component E2, Figure 2.1), it is clear that they arrived with a distinct and well-established ceramic tradition. Though their pottery bears some similarity to Chournos Springs and many Bear River wetlands specimens, especially in terms of paste and thickness, the thin, finely-made, calcite-tempered Cave 1 ceramics are nevertheless easily distinguished from the earlier sand-tempered material.

In contrast, commonalities in temper, surface treatment, and rim decoration render much of the Cave 1 assemblage indistinguishable from Uinta Gray. Much of this material is thin, with carefully shaped and often tapered rims, and with a range of surface treatments that can include both undulating and exceptionally finely finished forms. While a range of skill is evident and examples of relatively poor work can be readily identified (for instance, note the uneven rims of serrated specimens FS nos. 1663.2, 1663.3, and 1663.5 in Figure 7.11), many of the potters at Cave 1 were expert craftswomen. At minimum, these individuals were well versed in the Uinta Fremont ceramic tradition, if they were not in fact of Uinta Fremont origin themselves. That is not to say that the Promontory people were simply a band or bands of Uinta Fremont transplanted to the Great Salt Lake basin. The bulk of the Cave 1 assemblage illustrates a strong bison-hunting focus as well as a stratum of Subarctic-influenced artifact types that continue to offer compelling support for the Promontory people consisting of or influenced to some degree by migratory Proto-Southern Dene.

It is entirely possible that Proto-Southern Dene groups acquired some familiarity with ceramics prior to their arrival in either the eastern Great Basin or northern Colorado Plateau. By AD 1000, well prior to the advent of the Promontory Phase, ceramics were made across the full extent of the Northern Plains (Byrne 1973; Meyer and Walde 2009; Peck and Hudecek-Cuffe 2003:83; Quigg 1988; Walde et al. 1995:22; Wormington and Forbis 1965). With some squinting, thick, shouldered Saskatchewan Basin ware (Byrne 1973) could, for instance, be seen as a possible inspiration for the frequently attested Plains flavor to Promontory ceramics (Aikens 1966, 1967*b*; Gunnerson 1956, 1969; Jennings 1978), especially in accounting for such details as an absence of handles and a propensity for lip decoration. The extent of similarity between Promontory pottery and Fremont ware suggests the greater influence was, however, Fremont.

The implication of a strong Uinta-series cast to the earliest Promontory ceramics is that the Promontory people encountered the Uinta Fremont prior to their arrival in the Great Salt Lake area, and it is from them that their ceramic tradition is primarily derived. This suggestion has direct bearing on larger questions of the route or routes of Proto-Southern Dene migration.

Early versus late Promontory Phase ceramics

Another principal finding from this appraisal of the newly collected ceramic assemblages from Promontory Point is that the earliest Promontory-affiliated ceramics do not precisely resemble the later-dating assemblages of the Promontory Phase in Utah Valley (cf. Forsyth 1986). While correspondences in individual elements at Cave 1 can often be found, their frequency is not so prevalent as to merit equivocation. Instead, a substantial proportion of the ceramic assemblage bears attributes that more closely fall within the range of variation known for Fremont ware, including thin vessel walls, rim shapes, and temper selection. Only at Chournos Springs, where calcite-tempered ware becomes dominant (but does not entirely replace sand-tempered Great Salt Lake Gray) in the uppermost deposits, do more favorable comparisons to Promontory-affiliated assemblages in Utah Valley come to the fore.

Historically, two broad descriptions of Promontory ceramics have been offered: one a thin, often (but not exclusively) rough-surfaced pottery with frequent (but again not exclusively) thickened and distinctively decorated rims and a particular preference for calcite temper (i.e., Promontory Gray; D. Madsen 1978*b*; R. Madsen 1977; Rudy 1953), and the other a thick, crudely finished pottery with an indiscriminate temper preference and most notable for its thickened, folded, and sometimes decorated rims (i.e., Promontory ware; Forsyth 1986; Janetski and Smith 2007; G. Smith 2004). Steward's (1937*a*) original definition is written broadly enough to have encapsulated both, depending on the details to which one appeals. I submit that both types are valid, and that the two assemblages examined here indicate a chronological seriation to the pottery of a tradition that, though ultimately quite divergent in form, can trace much of its origins to Fremont ceramics.

The former variant is representative of the Early Promontory Phase, dating to the latter half of the 13th century AD at Cave 1 and possibly earlier, based on limited chronometric data from sites in the Bear River wetlands. With an extraordinary preference for crushed calcium carbonate and particularly crushed calcite tempers, both Promontory Gray and Uinta Gray can be viewed as slightly differentiated types within a common Uinta Series of Fremont Ware. While this similarity greatly clouds the ability to easily classify individual sherds, a few characteristics allow the type name Promontory Gray to still be usefully applied. Promontory Gray lacks handles and shows an emergent preference for thickened rims, produced not by folding but by an emphasis on incised or punched rim decorations. Color differences may also exist, attributable to manufacture of Promontory Gray in the Great Salt Lake area with a paste that tended to fire dark gray to black.

Late Promontory Phase pottery, in which substantial divergence from Fremont ware can more readily be observed, occurs in well-dated contexts from the mid-14th to mid-16th centuries. Published descriptions of Promontory ware, especially the crushed igneous rock-tempered assemblages in Utah Valley, refer largely to this late material. If Promontory Phase pottery was emergent, developing over time from early forms into late ones no longer recognizable as Promontory Gray, the assemblage from the upper component at Chournos Springs takes an intermediate place within this spectrum. Here, thickened rims and folded lips seem more comparable to the Utah Valley ceramics than the material from Cave 1, but use of calcite temper persists. Contact with the local makers of Great Salt Lake Gray appears possible at both Chournos

Springs and Promontory Cave 1, although such an impressionistic observation is based on only a few examples of attribute-level blending: incised and thumbnail-punctate body decoration and grooved rims seen in the earlier deposits at Chournos Springs cross over on occasion into the calcite-tempered pottery at Cave 1, while what might be mimicry of calcite-tempered pottery occurs at the springs later, in the form of a crushed calcite slip. Contemporaneously produced pottery at both Promontory Point sites, as well as at various locales in the Bear River wetlands, also shows reliance on a common ceramic paste.

The subsistence patterns at Chournos Springs also seem to better correspond with sites in Utah Valley, where bison utilization is negligible and broad-spectrum wetlands foraging is the norm (Johansson 2013). As reviewed in Chapter 5, in a faunal assemblage of 9,050 specimens, the vast majority of which is highly comminuted, only five identifiable bison specimens were recovered (MNI = 2). Small artiodactyls such as bighorn sheep, mule deer, and antelope are far more common, as are birds and small mammals such as rabbits and other rodents. With abundant groundstone and evidence of seed harvesting and processing, Chournos Springs consistently fits the mold of broad-spectrum hunter-foragers working to extract every calorie from the landscape that they could. This contrasts sharply with the picture of communal bison hunters with a surplus of food, as indicated by a relative abundance of minimally processed bone, some of it burned for fuel, seen at Cave 1 (Johansson 2014; Yanicki and Ives 2017). The difference between Chournos Springs and Cave 1, replete with changes reflected in the ceramic record, epitomizes the difference between Late and Early Promontory Phase sites.

The precise relationship between Early and Late Promontory Phase pottery is not yet fully clear. Instead of positing a linear, genetic relationship between sequent types, developments reflected in the relationship between Uinta Gray and Promontory Gray could have been paralleled by similar modifications within other Fremont ceramic series in different locales. The diverse Cave 1 assemblage shows that such temper-based variants may indeed be found. Intrusive influence alone, as from a Proto-Southern Dene group bringing Plains-derived influences, is not enough, however, to account for the considerable morphological differences evident in Late Promontory Phase pottery. All the Early Promontory ceramics, regardless of temper, continued to more closely reflect the form of Fremont ware while other changes took place with the passage of time.

The suggestion that Promontory ware is in some way descended from Promontory Gray in fact runs counter to the theoretical processes underpinning a ware-series-type model (Colton and Hargrave 1937; Watkins 2009). Types should be the product of diversification within shared learned traditions, recognized at the classificatory level of wares, and not the other way around. This is, admittedly, an important problem, but it may be one rooted in limitations of the conceptual model rather than flaws in the culture-historical processes considered here. The ware-series-type model is not well-equipped to address ethnogenetic rather than phylogenetic processes of change, for instance as a result of the transfer of information between the makers of one ceramic type and another. Blended attributes and indistinct types are a possible outcome of such coalescent processes.

The social learning that would accompany the inception of pottery manufacture within a previously aceramic group, while still representing the transfer of a learned tradition, could also have had unpredictable outcomes. For instance, in a scenario where individual women with expertise in an established ceramic tradition were recruited into another social group, for the duration of those recruits' presence in the community, much of the group's pottery would appear expertly made. Other women in the group, while learning from and emulating the newcomers, would have made only poor copies. Noting the matrilineal skew inherent to learning ceramic production noted by Opler (1938, 1946, 1971), and especially the central role of the maternal grandmother, such contrasts between expertly and poorly made pottery could conceivably be repeated or amplified in subsequent generations depending on whether the senior women available as teachers were themselves expert potters or not, governed in turn by social rules and preferences towards endogamy or exogamy and the residence tendencies of descendant daughters and their spouses.

The concept of a ware is also predicated on some degree of socioeconomic stability on the part of generations of geographically dispersed pottery makers: it can be seen as a technological foundation on which more subtle themes of regional and group-level habitus play out. Such stability is, however, a bit of a myth. Significant changes in domestic mobility, resource use, and settlement patterns accompanied a widespread, permanent shift to wetlands foraging from maize horticulture at the end of the Fremont era (Janetski 1994). Changes in pottery production in the Late Prehistoric period may then reflect function-driven, behaviorally adaptive technological modifications (i.e., production of more durable utilitarian ware; Simms et al. 1997). Such a view is complementary within an emerging understanding of culture-historical dynamics in this time period. If the horticulture-to-foraging transition alone had the potential to effect morphological changes in ceramic production, even greater changes were afoot by the mid-13th century, with a growing body of evidence from Promontory Point for an incipient albeit short-lived communal bison hunting tradition as different again from wetlands foraging as foraging was from farming.

Bison hunting, social recruitment, and pottery

The bison hunting lifestyle, as epitomized by communal hunting on the Plains, "was inherently attractive: it was associated with… the capacity to produce significant economic surpluses on a regular basis" (Ives 2010:330). One did not, however, simply become a communal bison hunter. The decision to hunt bison *en masse* represented more than a mere subsistence shift, but a wholesale commitment to a rigidly constrained complex of logistical practices and ceremonies (Brink 2008; Oetelaar 2014). One particular logistical hurdle lay in gathering sufficient numbers of people for the endeavour, beyond the capacity of most local groups, let alone individual family-level bands. The ability to foster far-reaching alliances, particular to the open kinship networks of exogamously oriented bands, offered groups the means of periodically meeting in large numbers. The ties of intermarriage that brought groups together also played a blending role in their respective identities, with polyethnic societies being a noted outcome among Plains bison hunters (Berndt 2008:42–45; Binnema 2001:13; Colpitts 2015:423; Innes 2013:60–61, 70–72).

As is clear at sites like Chournos Springs and many others, no significant bison hunting complex existed in the Great Salt Lake area prior to the arrival of the Early Promontory Phase people (cf. Grayson 2006). Here, with the Promontory people well established by the mid-13th century, the onset of bison hunting at the scale seen at Cave 1, and to a lesser extent at the Bear River sites, was something altogether new. From the perspective of wetlands foragers accustomed to opportunistic hunting of individual animals, the ability of the Promontory people to undertake a mass bison kill would have been a demonstration of spiritual sanction and personal power, and a tremendously alluring prospect.

The extraordinary labor demands of hunting and processing bison on a large scale provide a powerful motive for group recruitment that integrates closely with the flexibility of groups to structure their kinship reckoning so as to actively favor alliances and intermarriage (as among many Subarctic Dene groups, and likely Proto-Southern Dene, cf. Dyen and Aberle 1974; Ives 1990). A Fremont flavor to the Promontory ceramic record parallels what took place on the Plains–Puebloan frontier in the 16th and 17th centuries between bison hunters (including Ndee groups) and maize horticulturalists (Baugh 1982, 1986; Habicht-Mauche 2012:390; Spielmann 1982, 1986; Vehik 2002). There, strong evidence of social recruitment can be seen in the manufacture of Puebloan-style ceramics on the Southern Plains, which Susan Vehik and Judith Habicht-Mauche have linked to alliance and intermarriage, including the recruitment of entire families or groups, in the shared work of bison hunting. The labor of women was particularly sought by the male leaders of prestige-seeking bison hunting groups, with polygyny, the taking of "chore wives," and even slavery all serving to accomplish the vast amount of work required in processing mass bison kills. In the Great Salt Lake area, the Late Prehistoric transition may evidence similar interactions not between farmers and communal hunters, but between post-horticultural "Fremont foragers" (Madsen and Simms 1998) who practiced individualistic, small-scale hunting and groups like the Promontory people who engaged in more intensive hunting and had a strong demand for additional group members.

It must then be recognized that the need of exogamous groups for alliances and intermarriage as tools for social recruitment would very much be a two-way street. If these strategies were indeed employed by the Promontory people, then they should also have been sending some of their own members out into other groups. A marriage alliance involving the recruitment of women into one social group, for instance, might also involve the loaning of young men for a period into the service of the allied group. Such arrangements provided multiple benefits of strengthening ties, familiarizing community members with each other's language, reconnoitering new territory, and legitimizing access to it (for examples from Subarctic Dene groups of how degrees of local group exogamy could affect an individual's exploitative range, see Ives 1990:209–28, 266–71; McDonnell 1975:95–96; for a comparable Kiowa practice of sending children to be raised with the Crow, see Mooney 1898:156).

There would thus be direct ethnogenetic consequences in both directions, over time, for being drawn into reciprocal patterns of member exchange. For allies of the Promontory people such as Uinta and Great Salt Lake Fremont groups, intermarriage may have provided a social mechanism by which formerly horticulturalist and forager peoples became drawn into participation in communal bison hunting activity, a vital step in the transition of some Fremont groups onto the northwest Plains, ancestral to the present-day Kiowa, by as early as AD 1300 (Ortman 2012:416-18; Ortman and McNeil 2017:163–69). Kiowa oral histories document this early south-to-north migration, as well as a period of residence in or west of the Rocky Mountains at the Missouri and Yellowstone headwaters, prior to the equestrian era (Keim 1870:1; Meadows 2016; Mooney 1898:153–54). If the Kiowa are descended from what were likely Great Salt Lake and Uinta Fremont groups, those being within the prehistoric ranges attested by both oral history and archaeology, one Dene-speaking people—the Kiowa Apache—is implicated even in the earliest stages of this transition (W. Clark 1885:10; Mooney 1898:156, 247). Their longstanding alliance, better characterized as mutual integration (despite the Kiowa Apache's far lesser numbers), antedates Kiowa contact with groups like the Crow and the Arapaho on the Plains, James Mooney

(1898:156) having observed that "neither tribe has any tradition of a time when they were not associated."

The origin of the mutualistic relationship between the Kiowa and Kiowa Apache is of pivotal importance in understanding the culture-history of the Late Prehistoric transition in the eastern Great Basin. If the Promontory phenomenon is to be understood, it is not simply as a Proto-Southern Dene event, but a series of relational, diachronous processes between Proto-Southern Dene and Fremont groups (for whom the term Proto-Kiowa may best apply), and between Fremont groups, some who had begun to adopt the bison-hunting lifestyle and others who had not, with each other. Subsequent persistent, but often enigmatic and heterogeneous shifts in ceramic production at far-flung sites of the region reflect the entangled trappings of this new lifeway.

Inferring migration routes from Promontory ceramics

We return now to the premise that Proto-Southern Dene did not originally possess a ceramic tradition of their own (Gordon 2012:327–8; Ives 2003; Warburton and Begay 2005:552–53; Wedel 1986:136). If a bison-focused Proto-Southern Dene population, possibly one that had developed the nascent vestiges of ceramic production on the Plains, were to have initially entered the Great Salt Lake area from the north, via the Snake River Plain and the Malad or Cache valley, Great Salt Lake Series pottery should have been the first Fremont ceramic tradition they encountered (Figure 7.17, *a*). That the earliest Promontory ceramics instead tend to be indistinguishable from Uinta Gray points to a route of entry to the Great Basin over the Wasatch Plateau to the east, and ultimately via South Pass over the Continental Divide from the Plains

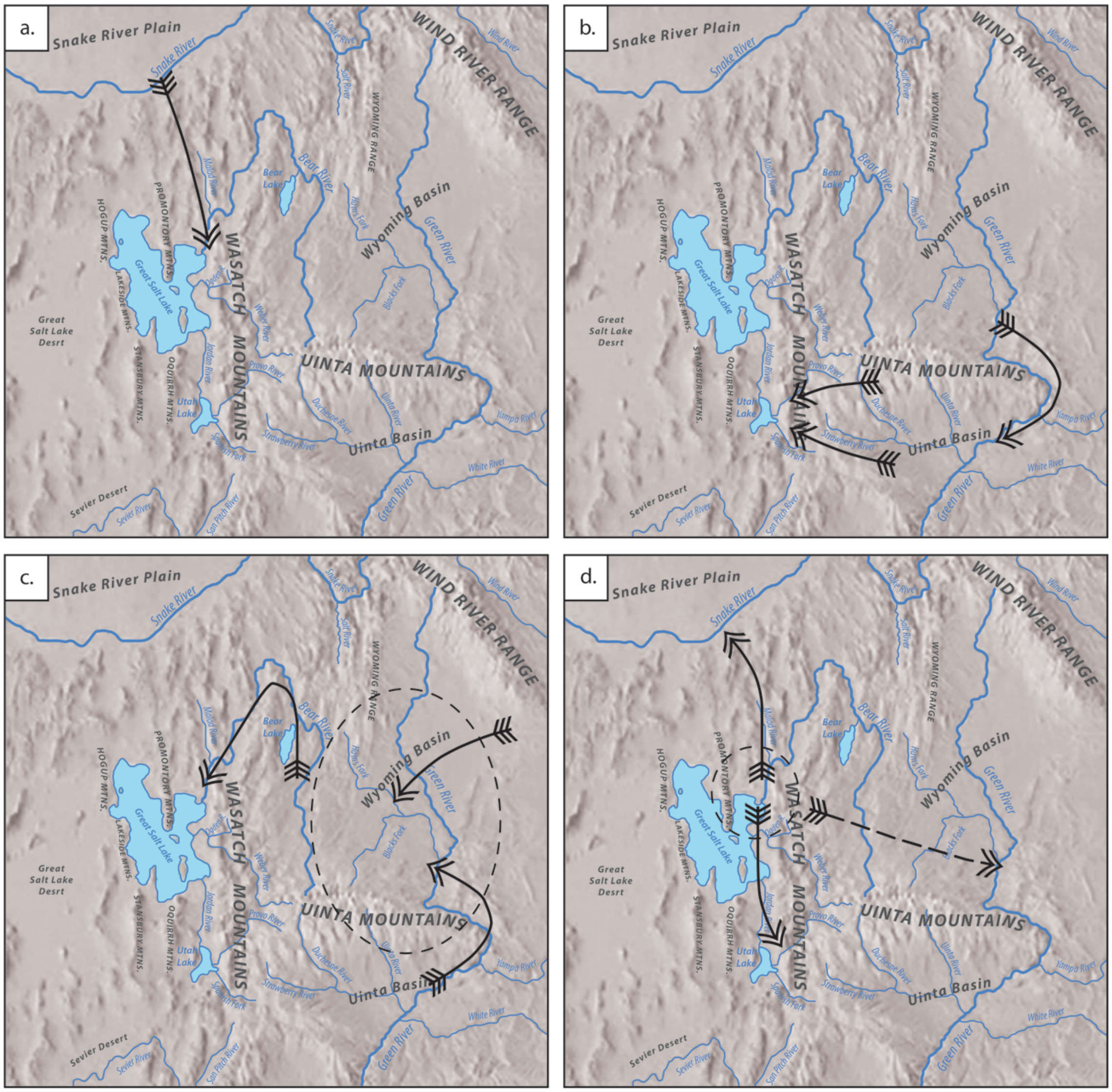

Figure 7.17. Possible migration routes of early and late Promontory-affiliated groups, as inferred from Promontory ceramics. *a*) Earliest Proto-Southern Dene entry to Great Basin from north, via Snake River Plain (rejected). *b*) Earliest Proto-Southern Dene entry to Great Basin from Utah Valley, via Uinta Basin (rejected). *c*) Contact between Proto-Southern Dene and Uinta Fremont (proto-Kiowa) in Wyoming Basin and subsequent entry of early Promontory Phase groups to Great Basin via Bear River. *d*) Dispersal of late Promontory Phase groups following abandonment of the Promontory Caves.

beyond. Steward himself speculated on such a migration route from the Promontory ceramic tradition, noting “it is entirely possible that it was derived from some northern Plains people. Even that the Navaho introduced it from Wyoming or thereabouts during their southern trek should not be ruled out of consideration" (Steward 1937:44).

Two principal zones of contact between a pre-Promontory, Proto-Southern Dene population and late Uinta Fremont groups, and subsequent routes of transit over the Wasatch Plateau, are possible. If Plains-based Proto-Southern Dene interacted with the Uinta Fremont within the Uinta Basin proper, following the Green River south beyond Flaming Gorge at the easternmost reach of the Uinta Mountains, a subsequent transit of the Wasatch Plateau would have taken place south of the Uintas. Such a route would presumably have followed the Duchesne River or one of its tributaries, a number of which are separated only by short mountain passes from the westward-flowing Provo River and Spanish Fork (Figure 7.17, *b*). There is no evidence for either route having been followed. Doing so would have resulted in an earliest occurrence of recognizably Promontory-affiliated material culture in the Utah Lake area rather than around the northeast Great Salt Lake. Calcite-tempered ceramics do not appear with any significant frequency in Utah Valley (G. Smith 2004; Smith and Janetski 2007; Promontory Phase ceramics found there are not easily confused with Uinta Gray for this reason), nor is the Promontory Phase associated with any degree of bison hunting there (Johansson 2013).

One anomalous Utah Valley site, Smoking Pipe (42UT150) near the mouth of the Provo River, is notable for its unusually high frequency of bison remains (NISP = 1,831; Grayson 2006; Lupo and Schmitt 1997). However, despite a range of six radiocarbon dates ranging from the mid-11th to mid-16th centuries, no Promontory-affiliated material has been identified there (Billat 1985; Janetski 1990). While collections from this site bear revisiting, Utah Valley appears at present to have been bypassed by the initial forebears of the Promontory Phase.

Proto-Southern Dene and Uinta Fremont contact instead appears more likely to have taken place north of the Uinta Mountains in the Wyoming Basin. A route of transit over the Wasatch Plateau following tributaries of the upper Green River to the headwaters of the Bear River, and from the Bear River to the Great Salt Lake (Figure 7.17, *c*), better accounts for the initial appearance of ambiguous calcite-tempered ceramics at Cave 1 in the mid-13th century and for the distribution of similar pottery at more poorly dated but broadly contemporary wetlands sites at the mouth of the Bear River. The terminal Fremont sites in this vicinity, where Promontory and Uinta Gray ceramics are intermixed with Great Salt Lake Gray, also feature relatively intensive bison hunting not otherwise typical of Fremont occupations in the Great Basin (Bear River 1, 2, and 3 and the late component of the Levee site; Aikens 1966, 1967*a*; Grayson 2006; Fry and Dalley 1979; Lupo and Schmitt 1997:55–56; Shields and Dalley 1978). If these sites are not attributable to the Promontory people themselves, they demonstrate a period of close Promontory and Uinta Fremont interaction with the Great Salt Lake Fremont, corresponding with both the southwestward migration of Proto-Southern Dene and northwestward movement of Proto-Kiowa groups.

Uinta Fremont groups made at least occasional forays beyond Flaming Gorge on the Green River into the Wyoming Basin (Hakiel et al. 1987; D. Hill and Wolfe 2017; Loosle and Johnson 2000; C. Smith 1992; Truesdale and Hill 1999). In evaluating southwest Wyoming as a possible locus for contact between pre-Promontory Proto-Southern Dene and Uinta Fremont groups, at least one site between Flaming Gorge and the Bear River headwaters, 48UT199 (Schroedl 1985; C. Smith 1992:57–58), stands out. People here were bison hunters who obtained large quantities of game: in limited excavations (4 m x 5 m), two boiling pit features were found filled with FCR and processed bone. Of 1,069 bone fragments, the only identifiable taxon at the site was bison (NISP = 34). Only six ceramic sherds were found, these tempered with what Patricia Dean identified as "angular fragments of marble" (cited in C. Smith 1992:57), fitting the Uinta Gray template for calcium carbonate tempers. The site itself, though, is not typical of the Uinta Fremont, being rather more like the early Promontory Phase with Uinta Gray-like pottery and intensive bison utilization, missing only the distinctive, often perishable, Subarctic Dene elements like moccasins. It is what should be expected if Uinta Fremont women were being recruited into an otherwise aceramic bison-hunting group. The boiling pits at 48UT199 yielded a single radiocarbon date, 930 ± 70 BP (TX-6314; C. Smith 1992:57), which falls within the range of 990–1246 cal. yr. AD (OxCal v4.3.2, Bronk Ramsey 2009, 2017; IntCal13 atmospheric curve, Reimer et al. 2013). This age range, potentially overlapping but most likely antedating peak occupation of the Promontory Caves, fits well with expectations for Proto-Southern Dene and Uinta Fremont contact prior to entry into the Great Basin.

The arrival of the Promontory phenomenon in the eastern Great Basin, as marked by Promontory Gray/Uinta Gray pottery around the northern rim of the Great Salt Lake, was also accompanied by a brief florescence in bison hunting. Patterns of interaction and social recruitment are reflected in continued blending of ceramic forms with Great Salt Lake Gray in the late 13th century and by the appearance of highly micaceous Knolls Gray pottery in mixed assemblages. The story beyond this point, however, appears to be one of stylistic and geographic divergence (Figure 7.17, *d*), possibly linked to the local extirpation of bison, a consequence of increased hunting pressure, cyclical drought, or both (cf. Bowyer and Metcalfe, in prep.; Grayson 2006; Johansson, in prep.; Lupo and Schmitt 1997). By the mid-14th century, Late Promontory Phase populations that stayed resident were making thicker, poorer-quality ceramics in Utah Valley, and calcite-tempered pottery continued to be made along the Bear River at the Orbit Inn site, but without a significant emphasis on bison (Janetski 1994; Johansson 2013; Simms and Heath 1990:802). The fate of these groups after about A.D. 1550 is difficult to ascertain (see Janetski, In prep.).

Other groups continued hunting bison, but to the north. In Idaho's Snake River basin, 10OA275 shows a familiar co-occurrence of intensive bison harvesting with both calcite-tempered Promontory Gray and often highly micaceous Great Salt Lake Gray ceramics (Arkush 2014, In prep.), a pattern that corresponds closely with the Promontory Point sites. In addition to 10OA275, other later occurrences of Promontory Gray and Great Salt Lake Gray, sometimes commingled, are widely distributed along the upper Snake River in the 14th and 15th centuries (Butler 1981:2–3, 1983:6–8, 1986:48–49; Gruhn 1999, 2006). This northward migration pathway corresponds well with the archaeological trajectory of the proto-Kiowa from the Great Basin to the Yellowstone/Missouri headwaters (Ortman 2012; Ortman and McNeil 2017), with a recognizable Promontory component that could reflect longstanding alliance with the Kiowa Apache, and with Kiowa oral traditions that mention residing along a large river west of the Rocky Mountains and splinter groups of the Kiowa that continued even farther in this direction to the north and west (Meadows 2016; Mooney 1898).

Of final note is the possibility that some descendants of the Promontory people returned east to the Plains. A simple parent-daughter relationship between the Promontory Phase and Dismal River aspect (cf. Aikens 1966; Gunnerson 1956) insufficiently addresses the much earlier age of western Dismal River than a post-Promontory inception would allow (Gilmore et al., in prep.; Gilmore and Larmore 2012), while the migration routes offered here are in the opposite direction. If anything, the early contact between Proto-Southern Dene and Uinta Fremont groups in the Wyoming Basin postulated here represents a fork in the road. There is no reason to believe that all Proto-Southern Dene, or all Proto-Kiowa, went west to the Great Salt Lake in the 13th century. It is reasonable to expect that those that did maintained ties with related groups back in the direction from which they came. Thus, while other groups continued on their own parallel trajectories east of the Rocky Mountains, in the Wyoming Basin, or on the northern Colorado Plateau, they could have been joined by post-Promontory groups at a later date.

It may be such a back migration that is reflected in the long-attested similarities between Promontory and Dismal River ceramics, to which can be added the early occurrence of highly micaceous Knolls Gray at the Promontory Caves. Highly micaceous residual clays, associated not only with some Dismal River ceramics, but with Ndee and Proto-Ndee ceramics on the Plains and in the Southwest (Eiselt 2005; Trabert et al. 2016:367; Habicht-Mauche 1988:339, 405), first appeared in the Southwest between A.D. 1550–1650 (Eiselt 2005). An antecedent form may exist in the Knolls Gray type at Promontory Cave 1 that draws together the Ndee of the Plains and Southwest with forager populations on the margins of the Fremont world.

Summary

Ambiguities and, in some cases, contradictions in discussions of Promontory-attributed ceramics draw attention to a complex cultural phenomenon that has persisted in begging satisfactory explanation. The previously missing lynchpin to understanding the Promontory phenomenon is a refined chronology (Ives et al. 2014; Ives 2017) that allows disambiguation between early and late forms of Promontory-affiliated ceramics to be made. The solution offered here to the Promontory problem, as it was conceived by Don Forsyth (1986), is twofold.

First, the confounding similarity between type descriptions for Promontory Gray and Uinta Gray, and the ensuing difficulty in differentiating the two (especially at sites in the Bear River wetlands), is the product of a significant historical relationship between the pottery's makers. This relationship can best be described as genetic, and at least in part the result of social recruitment by Proto-Southern Dene groups of Uinta Fremont women; this interpretation does not preclude the possibility that increasingly mobile Uinta Fremont groups also resided in the Great Salt Lake area after transitioning to a communal bison hunting lifestyle.

Second, Promontory pottery (and by extension the Promontory Phase) can be subdivided into early and late variants, with Late Promontory Phase pottery being sufficiently divergent to merit classification as a distinct ware from earlier Fremont pottery. While emergent differences in vessel morphology are difficult to reconcile with the theoretical underpinnings of the ware-series-type model, it is noteworthy that these changes are only incompletely manifest during the occupation of the Promontory Caves and continued to develop in the decades subsequent to their abandonment.

The Early and Late Promontory Phases, at least in the Great Basin, can be distinguished by more than just pottery, but on a dramatic shift in subsistence in the 14th century from a focus on bison to wetlands and riparian resources (see also Janetski, In prep.). The Promontory Cave 1 assemblage also completes a trifecta with Subarctic Dene goods, many of them highly perishable, that indicate a Proto-Southern Dene presence. The Promontory phenomenon in a broader sense may best be understood as a period of cultural contact between small groups of migrating Dene peoples and resident Fremont peoples in the eastern Great Basin and northern Colorado Plateau that included Proto-Kiowa, and perhaps more broadly Proto-Kiowa-Tanoans. The emergence of the northward-moving Kiowa and Kiowa Apache tandem of social identities is one very likely outcome of this period of interaction and coalescence, but not necessarily the only one. By the 14^{th} century, after the Caves' occupation by Promontory-affiliated peoples and concomitant with a local decline in bison availability, descendant groups likely pursued a number of alternatives, drawing on affinal ties and alliances while either leaving the Great Salt Lake area or staying, in the decades and centuries that followed.

Conclusion

When Julian Steward first presented his findings from the Promontory Caves, he recognized that the material record left by the people who once lived there stood apart from the village-dwelling, horticulturalist peoples from elsewhere around the Great Salt Lake. Questions about Promontory–Fremont relations have long lingered in the nearly nine decades that have passed since Steward first worked at the caves, but the general tenets of the synthesis he first offered are essentially upheld here.

Resolution to the "Promontory problem" lies primarily in the matter of timing. The identification of the Early Promontory Phase, here on the basis of differences in ceramic production from later assemblages, is a key contribution of the present work. Early Promontory Phase people lived at the Promontory Caves in the late 13th century, decades and even centuries prior to later occupations in Utah Valley and elsewhere. Mechanisms for sociodemographic changes underway during the transition to the Late Prehistoric period in the eastern Great Basin, I have proposed, can be found in the complementary social demands for alliance-seeking and intermarriage imposed by exogamous systems of kinship reckoning, and in the brief efflorescence of specialized bison and other big game hunting. Some implications and limitations for the interpretation of sites from the Late Prehistoric transition are reviewed in the following sections, together with directions for future research.

Culture Contact and the Early Promontory Phase

People of the Early Promontory Phase were from the outset distinct from contemporary Great Salt Lake Fremont groups. Plains influences are pronounced in the material record from the caves, with an emphasis on big game hunting and a demonstrated capacity to hunt bison with an intensity not previously seen in the Great Basin. Despite food yields that might have sustained a small population for a large part of the year, a lower degree of sedentism is implied in residence at the caves, where people lived untethered by the constraints and trappings of wetlands food harvesting. A ready comparison between these two lifeways can be found between Cave 1 and the nearby Great Salt Lake Fremont settlement of Chournos Springs. At the caves, there is no labour-intensive groundstone industry or evidence of elaborate plant food processing, and there is relatively minimal comminution of bone, some of which appears to have been simply burned for fuel. There is no sign of time invested in stone gathering for pit-boiling or roasting. Only cursory preparation of the living space, consisting of laying down fresh juniper bark, took place; floors were not excavated, packed down, or periodically cleaned out. No superstructure of posts interlaced with thatching was constructed, nor was mud-plaster applied or earth excavated to cover the walls. Signs of all those missing elements are present at Chournos Springs, conveying an impression of one population that was highly agile and one that would not so easily leave behind the fruits of their labour, and perhaps could not if their subsistence, even if for only part of the year, was tied to wetlands resources on Promontory Point. The same dichotomy can be found on the other side of the peninsula, with small villages in the wetlands adjacent to the Bear River and uplands sites—small caves and rockshelters, for the most part—bearing cultural material similar to the caves, if never so extensive as at Caves 1 and 2 (Steward 1937*a*; Stuart 2016).

Accompanying the evidence for a dramatic difference in lifestyle are well-preserved cultural elements of northern, possibly Subarctic origin at the caves, most notably distinctive and abundant bison-hide moccasins. These announced the Promontory people as a new presence in the region, and one with ties to a linguistically and genetically attested wave of Proto-Southern Dene migration. The term "wave" is used here with some reservation, however, for it is not intended to imply some horde of invaders arriving from the north. The reality of Cave 1 belies such a narrative, where population sizes, while growing (Billinger and Ives 2015), are probably more analogous to a small or mid-sized band, estimated based on accumulated cultural material (Hallson 2017) and space availability to have been between ca. 25–50 people and between four and seven households (Lakevold 2017:143–152). The term pulse is probably more appropriate in reference to the arrival of Proto-Southern Dene in the eastern Great Basin, part of a hypothesized network of several such bands, perhaps only loosely affiliated and only occasionally detectable in the archaeological record (as at 10Oa275 in Idaho and Franktown Cave, Colorado), and scattered across a considerable geographic area that by the late 1200s extended at least from the Great Salt Lake to the Plains.

When they arrived at the Great Salt Lake, the earliest Promontory people encountered a heterogenous social milieu of peoples from both east and west of the Great Salt Lake, inclusively termed the Great Salt Lake Fremont, although the characteristic maize horticulturalist lifestyle of the Formative Period had already dissipated and had never really taken hold to the west. By the time of their arrival, the inhabitants of Cave 1 were also already demographically complex, a product of social recruitment primarily of Uinta Fremont women from the Uinta or Wyoming Basins. For a time, Early Promontory Phase peoples thrived as highly specialized big game hunters. Using gambling as a proxy for social interaction, relations between the Promontory people and their neighbours were generally positive, characterizable as alliance-seeking and highly exogamous.

Effecting both demographic change and expanded social and territorial reach (Eiselt et al., in review), the effects of interaction between Early Promontory, Uinta Fremont, and Great Salt Lake Fremont groups were ethnogenetic in character. Promontory society especially featured the recruitment of women from various backgrounds, an observation supported by a diverse range of women's gambling paraphernalia and ceramics. Pottery at Cave 1 was distinct from predecessor and contemporary Great Salt Lake Fremont styles, as seen at Chournos Springs, but nevertheless appears derived from the larger Fremont ceramic tradition, possibly even having been made by women of Uinta Fremont origin with local materials. With time, the ceramics at both sites came to resemble each other.

It is strongly suspected that at least some late Fremont groups, especially those originating in the northern Colorado Plateau (i.e., the Uinta Fremont), were speakers of Proto-Kiowa or Proto-Kiowa-Tanoan languages. Kiowa oral history suggests Proto-Kiowa groups may also have been migrating northwestward at this time. The relocation of Uinta Fremont bands who had taken up a bison hunting lifestyle, itself a consequence of association with Proto-Southern Dene groups, should therefore be anticipated in the time period corresponding to the Early Promontory Phase. In the Great Salt Lake area, it may be difficult to differentiate between groups that were Proto-Southern Dene or Proto-Kiowa, especially at sites where only non-perishable diagnostics like projectile points and ceramics are recovered.

The question of whether the Promontory Phase should be thought of as archaeological shorthand for Proto-Southern Dene in the Great Basin, while welcomed, is not easily answered. The case is strongest for the Early Promontory Phase. Proto-Southern Dene were certainly part of the Promontory phenomenon, but sites like Cave 1 may constitute only a visible minority within what is conceived of here as a coalescent tradition. Band-level differences may best be considered in the comparison of individual sites; the designation of the Levee Phase remains a useful nomen for those Great Salt Lake Fremont sites from the 12th and 13th centuries with pit houses and wetlands adaptations, limited utilization of bison, and complex ceramic associations including both Fremont and, to a lesser degree, Promontory and Uinta Fremont ceramics (insofar as they can be differentiated). However, the extent of the Levee Phase remains poorly defined, and additional contemporary distinctions may yet be parsed out from late Fremont occupations around the Great Salt Lake (Stuart 2016:59–60).

The Fremont-era settlement of Chournos Springs corresponds quite well with a Levee Phase designation, especially in direct comparison to Promontory Cave 1. The blended nature of the assemblage from the latest period of occupation at Chournos Springs, coupled with a lack of evidence for bison hunting, is more difficult to assign to either the Early Promontory or Levee phases; in many respects, the closest comparator is the Late Prehistoric assemblage of the broadly dated Orbit Inn site. If their emergence around the north end of the Great Salt Lake is considered analogous to processes underway in the Utah Valley by the 14th century, they may serve to illustrate the cultural position of the Late Promontory Phase as descended, through coalescent processes, from multiple traditions.

Bison Hunting in the Eastern Great Basin

A major corollary of this discussion is the importance of big game hunting, and especially bison, to the Early Promontory people. It must be conceded that the volume of bison remains at

Promontory Cave 1 is impressive only on a local level. The faunal assemblage cannot in any way be mistaken for the masses of bone that accumulated at communal bison kill sites on the Northern Plains, where jumps and pounds could commonly yield more than a hundred animals in a single event (Brink 2008). The several hundred bison needed to produce the many moccasins found at and projected to remain in the unexcavated portions of Cave 1 (cf. Reilly 2016; Hallson 2017) would nevertheless have required access to considerably more hide than could be had from the occasional hunt of single animals. If not equivalent to the apogee of communal bison hunting seen on the Plains, Promontory hunters must have operated on a scale more akin to that than the local, low-level baseline. This remains a major difference between the Early Promontory occupation of Cave 1 (and probably also Cave 2) and other Formative and Late Prehistoric sites. At the very least, the Early Promontory people possessed a comfort and familiarity with bison hunting that was without precedent among earlier populations.

The paucity of bison bones at Fremont-era occupations like at Chournos Springs is curious and stands in stark contrast to the Promontory Caves. It would be a simple thing to dismiss the difference as being between farmer-foragers of the wetlands and more proficient big game hunters at the caves. The inability to procure bison effectively could, however, be attributed to economies of scale. Harvesting big game such as bison took considerable human resources both to procure and to process. The absence of bison may then be a difference attributable to population sizes, but such a simple explanation seems inadequate. The population of the caves may not have greatly exceeded the few households that may also have been present at the springs.

Given the considerable caloric returns offered by a single bison, it may at first seem odd that great effort would not have been made to procure them if they were available. A second possibility, then, is that bison were not an endemic aspect of the Promontory fauna—at least, not without substantial human intervention. Typically, game drives, whether involving a jump or corralling animals within a confined space or impoundment, required an enormous catchment basin. In the case of bison, hunters could spend days coaxing a herd into the optimal position for a drive to begin, with drive lanes at one major jump complex, Head-Smashed-In, extending 16 km from the kill zone into the Porcupine Hills of southern Alberta (Brink 2008). Drive lanes associated with bison kill sites dot the Northern Plains, with parallel rows of cairns and brush marking the funnels animals were stampeded through en route to a jump or impoundment; similar arrangements exist in the Subarctic and Arctic for directing caribou (Brink 2005, 2008; Greer and Le Blanc 1992; Hearne 1795:78–79; McKennan 1969), but these were not always necessary. In the boreal forests of northern Alberta, hunters proved themselves adept at using natural features in communal game drives, with large numbers of brush-beaters fanned out in an enormous arc directing animals to natural bottlenecks formed by steep-sided river oxbows. Heming (1936:233) provided an account of either a Dane-zaa or Nîhithaw (Woodland Cree) communal hunt:

> Two famous places for drive hunting in olden days were Point Carcajou on Peace River, and the Grand Detour on Great Slave River. The former driving ground was about thirty miles long by about three miles across, while the latter was about fifteen miles long by about three miles across. The mode of hunting was for a party of Indians to spread out through the woods, and all, at an appointed time, to move forward toward a certain point, and thus drive the game before them, until the animals, on coming out into the open at the other end, were attacked by men in ambush…. [E]ven if a drive of only a few miles were made [,] the Indians

> could count on securing two or three bears, three or four moose, and twelve or fifteen caribou. [Heming 1936:233]

Another account of this form of hunt appears in *Diné Bahane'*, in which Coyote directs sheep on a mesa top towards the natural bottleneck of a narrow bridge of land, where a group of hunters, Coyote's brothers-in-law, lie in wait (Zolbrod 1984:143–44; see also Kluckhohn et al. 1971 for Diné coordination of antelope drives). Only a small group of hunters is described in the latter, mythologized account, though the brush-beating technique should still be considered a coordinated form of hunting of at least intermediate scale. Though not hundreds or necessarily even dozens of hunters need have been involved, knowledgeable individuals who could coordinate the efforts of others were a prerequisite.

The west side of Promontory Point offers a bottleneck that could have been utilized in this fashion. Beginning in the vicinity of Rozel Flat at the north end of Gunnison Bay, game directed southward could be forced along a narrow strip of ground between the muddy Great Salt Lake flats and the steep slopes of the Promontory Mountains. As long as animals could be prevented from escaping up valleys such as Miller Canyon, they would eventually arrive at a natural choke point: an east-west spur of the mountains extending into the lake, with the easiest way over being a gentle slope cresting in the narrow, grassy saddle between Promontory Caves 1 and 3, and where a natural blind and some surface-collected projectile points indicate hunting took place. To make use of this feature would require coordinated effort on the part of a hunting group, and allows for the possibility that peoples living on the point did not routinely have access to bison unless they were familiar with strategies for managing strategic large game hunting.

While perhaps satisfactory in explaining the scant bison remains at Chournos Springs in comparison to the caves, low bison yields are a pattern that is common both throughout the Great Salt Lake area and across the Great Basin and Colorado Plateau. A further possibility must then be considered, that bison were accessible and people were present in sufficient numbers to harvest them effectively, but they actively chose not to hunt them. This could tie into broader perspectives on bison across the Southwest which show that, despite their inordinate value from an optimal foraging perspective, cultural constraints could bar their use. Dolores Gunnerson (1972) noted that among Puebloan peoples, bison were feared and consequently avoided. The effects of this aversion to bison are clear in the Puebloan archaeological record, where bison are utterly absent from many faunal assemblages (Muir 1999:47), and where bison materials were present, likely resulted from systematic trade with Plains peoples (Eiselt 2012; Spielmann 1982, 1986, 1991).

Consider also the following description of Kusiutta antelope and jackrabbit hunting, and how it might also apply to the hunting of bison:

> The cooperative hunts of the Goshutes did not permit permanent associations of families for several reasons. First, these hunts lasted only while the quantity of meat taken was sufficient to feed the assembled crowd, possibly a few weeks. Second, alignment of families for hunting was often different for each species of game. Pronghorn and rabbit were the most important species in the area occupied by the Goshute, but they often were found in different parts of a valley. Moreover, the important hunts were held only where there was an antelope (pronghorn) shaman or rabbit-drive director; not every valley had such men. Therefore, for communal hunts, families traveled from their village or from where they happened to be gathering seeds to the most convenient location and often cooperated with other groups of

> people on successive hunts. They might join families from across their valley for a rabbit drive, go to a neighboring valley to hunt with its residents in a pronghorn drive, and associate with immediate neighbors to hunt deer in their own mountains. If their local pine nut crop failed, the next year they might be thrown into association with still other people for such hunts. [Defa 2003:82]

Rather than implying that some groups lacked the knowledge to hunt bison, they may have lacked the social sanction offered by ceremonially earned rights to hunt them. If coupled with a prevalent aversion to bison rooted in fear, the interpretive significance of the above quote is quite profound in considering the social impact of the arrival of skilled bison hunters at the Great Salt Lake. Even in the absence of large-scale kill events like bison jumps and pounds, there is entailed precisely the kind of social flexibility, through recruitment of group members, to take on larger hunting yields than more modest group sizes could handle independently. The capability of harvesting large numbers of bison, especially if accompanied by a ceremonial complex proffering the right to hunt them, would have served as an impressive demonstration of personal, supernatural power on the part of the leaders of such groups. The relative surplus of resources available to bison hunters, and the ability to redistribute it, would serve in the politics of prestige enhancement, cementing a hierarchy of status between those who carried out such hunts and those who did not. And all the while, bison hunting groups would have been driven to maintain sufficient numbers and territorial access, through an outward-reaching network of allied groups, for this lifestyle to persist at greater or lesser scales.

Multiple mechanisms existed to entice or compel others to join big game hunting groups. Intergroup alliances forged through exogamous intermarriage were one pathway that was actively pursued. This could include high-status males engaging in polygyny, with the labour of multiple "chore wives" increasing the amount of game that could be processed. More passively, entire family units or small bands might have relinquished their own autonomy to take up residence with another group—with impacts to social identity that would be expected when perceived differences in success were especially pronounced.

Comparative differences in resource wealth between hunters and foragers could also have been exploited through gambling, which could in extreme cases lead to the acquisition of debt-slaves. Archaeologist Allan Bryan was fond of describing Wilson Butte Cave, where over 100 bone gaming pieces were found, as "the Las Vegas of Idaho" (Ruth Gruhn, personal communication, 2015). At Promontory Cave 1, a similar casino analogy would not go far amiss. With their comparatively limited capacity for resource generation and storage, wetlands foragers pitting their goods against the amassed resources of successful bison hunters at the caves might have engaged in something as futile as betting against the house. Comparisons may also be invited to the rich gaming and gambling record of Chaco Canyon, home to "contests between elites and outsiders from the surrounding region" (Begay 2004:59), and to the Diné story related by Marietta Wetherill (1997) of visiting bison hunters who loved to gamble. In a high-stakes intergroup gaming scenario, big game hunters dealing from a position of surplus would be in a position to make large wagers while absorbing relatively little personal risk. Foragers sufficiently enticed to match large wagers, on the other hand, could quickly find themselves at a disadvantage if they wagered gathered wild foods that could not easily be replenished until the following year's harvest. The temptation to engage in such risky behaviour might well have been too great to resist, if historic accounts of bettors routinely losing all they had are any measure.

Not all processes leading to demographic shifts and blended, ethnogenetic archaeological signals need have been amicable, or even peaceful. Dominant groups could even have imposed a level of outright hegemony in the Late Prehistoric transition, raiding less powerful ones for slaves and asserting territorial control through the tactical superiority afforded by strength of numbers (and so mirroring events in the Great Basin following the acquisition of horses in the Protohistoric period). No clear evidence for such conflict appears in the archaeological record, though the possibility cannot be ruled out completely. In this regard, the introduction of the sinew-backed bow and solid wood arrows to the Southwest between ca. AD 1200 and 1400 (LeBlanc 1997), including an example from Promontory Cave 1 (Steward 1937*a*:17), has been implicated as having "influenced the character and/or intensity of warfare... [and] contributed to the spate of violence and population movements" in the Southwest in the 13th century (Kohler et al. 2014:449).

A decline in the local availability of bison, probably by the mid-14th century and perhaps as early as ca. AD 1300 (Bowyer and Metcalfe, in prep.; Johansson 2013; Lupo and Schmitt 1997), presented a choice to groups that marked a great divergence in social identity. Bison-hunting groups could simply depart the region, certainly to the Snake River area, and more speculatively back to the Colorado Plateau and even the Plains. Some groups also chose to remain in the Great Salt Lake and Utah Valley, no longer recognizable as either Fremont or Early Promontory but probably polyethnic in character. These the Late Promontory peoples returned to the same wetlands-adapted focus that many Fremont peoples practiced, both in the post-horticulturalist period and at least periodically long before.

Continuing the Search: Implications and Future Directions

The explicitly coalescent nature of many peoples' recent histories requires that archaeologists explore and understand periods when groups came together. Archaeological models of culture change, at least at the level of artifact styles, often struggle to adequately describe such processes. A focus on distinction, and what sets groups apart, is a natural one, given that difference is inherently identifiable. Within the business of taxonomy and classification, objects and assemblages that don't fit into neatly defined categories are a bit of a nuisance and a bother. But as individuals and groups' life histories not just diverge, like branches from a tree, but interweave like channels in a many-braided stream (Moore 1994*a*), both the separation and the mixing can be seen as essential aspects of the lived human experience.

When it comes to the origins of the Southern Dene and Kiowa, much more than the branches, or end points, are known. Throughout the period following European contact, references to both the Ndee and Kiowa describe peoples, referred to by many different names, who were on the move. Kiowa and Kiowa Apache oral histories in particular describe a northern ancestral homeland in the Rocky Mountains, far removed from their present-day territory on the southern Plains, and deeper histories that place them south again, but west of the Continental Divide. For the Diné, too, although already established in Dinétah by the time of Spanish contact, oral histories are replete with accounts of the gathering of peoples and a process of becoming. For both Southern Dene and Kiowa alike, modern tribal identities can safely be understood as a drawing together of several groups, be they clans, bands, or even individual families, not all necessarily being from the same place or speaking the same language, and each having followed their own distinct historical trajectories to historic times. No one ever-branching cladistic tree, however many the limbs, can adequately convey either set of histories. Typologically mixed assemblages are the key to identifying such coalescent processes.

The oftentimes enigmatic record of the Late Prehistoric transition in the Great Salt Lake area captures one such moment of ethnogenesis, especially as reflected in ceramics. The development of the Promontory Gray type from the calcite-tempered Uinta series has been explored in the greatest detail here, interpreted as the work of Fremont-trained women, some of whom had been recruited into dominantly Proto-Southern Dene groups. The examination of the ceramic record from Promontory Point, though, has also revealed a need for the reappraisal of ceramic assemblages from other sites around the Great Salt Lake, many of which feature extensive mixing of contemporaneous types, and many of which bear styles that are typologically enigmatic. This need not entail a typological reappraisal, as has already been done with equivocal results, so much as a reconsideration of the theoretical underpinnings of why variability exists in many collections, and how new types emerge. A classificatory scheme that differentiates stylistically distinct types within temper-based series (i.e., following the principles elaborated by Watkins 2009) is largely adequate for identifying ceramic traditions that developed, through processes of divergence, at different locales. But extensively mixed ceramic assemblages, both at type and attribute levels of analysis, suggest social dynamics not just between Promontory Phase and late Fremont groups, but Fremont groups with each other, occurring for the same reasons that have been raised here. Exogamy among various local groups led to the sociodemographic movement of female craftspeople who brought their stylistic preferences with them, and who then exchanged knowledge with others in their communities, leading in some cases to blended assemblages, and possibly emergent styles.

While I have said the temper-type classificatory scheme is adequate, the application of this scheme often is not. The Great Salt Lake ceramic series is especially problematic, historically serving as a catch-all for a great many potteries that were constructed with very different tempers, including a variety of crushed rocks, sands ranging from pure quartz to pure mica, shell, and no temper at all beyond the trace particles of quartz or mica residual to the parent clay. A number of corollary propositions are untested—for instance, that stylistic attributes common to one temper (i.e., paint, surface treatment, decoration, and rim shape) are common to all. It is by no means evident that co-occurrence should equate to typological equivalence. Anecdotal observation of collections from around the Great Salt Lake suggests that the temper variants are patterned differently at various locales, such as Willard Bay, the Bear River wetlands, and the west side of the lake (Stuart 2016). While hints of this patterning are evident in individual site reports, the geographic distribution of these temper-based subvariants has yet to be adequately, empirically described.

Analysis of parent clays through LA-ICP-MS methods also holds intriguing potential to demonstrate who shared knowledge of and access to high-quality clay procurement areas, and how the proportions of different ceramic variants that were locally produced differ between sites. The preliminary work undertaken here has shown that several readily distinguished clay types are identifiable in the region; this very limited sampling has, however, barely scratched the surface. I suspect that the assemblages at many sites—notably in the Bear River wetlands and Salt Lake Valley—were locally produced by women of different backgrounds who believed that pottery should be produced in different ways and in some cases went to considerable lengths to obtain the raw materials needed to produce pottery in the ways they preferred. With expanded testing, much more complicated social networks may be revealed showing which locales interacted with each other, through the movement of individuals and ideas, and perhaps also which ones did not. There thus exists great potential to enhance our present understandings of intergroup relations before, during, and after the Late Prehistoric transition.

The hypothesized chain of events reviewed in this work begins with contact between knowledgeable bison hunters, Dene-speaking people most probably niche-adapted to a modest scale of big game procurement in upland headwaters (Eiselt et al., in review), and peoples of the terminal Fremont Complex, probably Proto-Kiowa-Tanoans, themselves in the midst of a centuries-long shift from maize horticulture to a more varied foraging economy. This does not mean a simple dichotomy can be traced where all bison hunters were Southern Dene and all more generalist foragers were Kiowa-Tanoan. Within the span of a single lifetime, individuals could have moved between groups and knowledge spread, whereby Proto-Kiowa groups also became bison hunters, a first and necessary step in the Protohistoric movement of the Kiowa to the Plains, accompanied by the Kiowa Apache who were bison hunters already. Both could have thrived in the Great Basin, for a time, so long as bison lasted. Additionally, Proto-Southern Dene individuals and groups could have come to specialize in the wetlands of the Great Salt Lake and Utah Valley, or more broadly to the various big and small game species of the Intermontane West, particularly in the period after bison availability declined. This would generally correspond with the initial period of adaptation to the resources of the Southwest that Sapir (1936) proposed for the eventual emergence of Diné identities, but can also be recognized as a return to familiar resources of the Subarctic and ancestral Northern Dene heritage (J.W. Ives, personal communication, 2018).

Owing to differences in the success of subsistence strategies both real (in terms of the amount of resource wealth available for redistribution) and perceived (in terms of associated connotations of personal, supernatural power), status differences were likely to have existed between members of bison hunting and smaller-scale foraging groups. While I have focused on the implications of this differential for social recruitment and the resulting expressions of ethnic identity in the archaeological record, there are also intergenerational linguistic implications as new identities emerged. These relate to mechanisms by which one language becomes dominant among groups of bilingual speakers (Flores 2015; Schmid and Yılmaz 2018; Silva-Corvalan and Treffers-Daller 2016) and by which groups actively signal their ancestral heritage and promote intergroup solidarity by use of a language, even if all group members do not speak it (Edwards 1984:289–91; Stevens and Swicegood 1987:73). Given that both Dene and Tanoan languages have been described as highly conservative and loanword-resistant (Kroskrity 2009; K. Rice 2012; Snoek 2015; Snoek et al., in prep.), the outcome of speakers of two such languages meeting is somewhat uncertain. Beyond this trend towards conservativism, status differences within ancestral populations merit additional consideration in understanding the dominance of Diné and Ndee languages even as the pace of recruitment from outside groups outstripped population growth among original Dene-language speakers (cf. Malhi et al. 2008). They also may be a factor in why similar processes did not occur among Kiowa and Kiowa Apache speakers, which have persisted in maintaining their respective languages after centuries of association.

Of final note, the acquisition and subsequent development of a ceramic tradition by Early Promontory peoples has provided an indication of the migration routes by which they entered into and travelled through the Intermountain West. This may provide some additional focus to geographic areas where the Proto-Southern Dene search image can be found in the archaeological record (cf. Ives 2017, in prep.). For instance, while attention has been drawn here to the role of the Wyoming Basin as an early contact zone, additional questions remain about whether Proto-Southern Dene populations are detectable moving not only westward, but southward beyond Flaming Gorge in the late 12th or early 13th centuries. Such a presence is anticipated in the broad region between the Continental Divide and the Green River, perhaps reaching to the frontiers of the Ancestral Puebloan world. Early contact and integration with peoples of the northern Colorado Plateau is suggested by the Promontory people's use of split cane dice, a form of gaming more commonly associated with Puebloan peoples than those of the Great Basin and Northern Plains, where styles of bone dice are archaeologically and ethnographically prevalent. Sites fitting the Proto-Southern Dene search image should be marked by a brief efflorescence in bison hunting coupled with the presence of Fremont-inspired ceramics (and the eventual adoption of pit houses by Dismal River, but not Promontory peoples), and some Subarctic traits. Hints of a parent tradition linking both the Early Promontory and Western Dismal River can be found in the appearance of moccasins constructed in identical fashion to the Promontory assemblage as far south as Mesa Verde (Yanicki and Ives 2017).

Sites in Utah Valley have long played a central role in defining the Promontory phenomenon. The lack of any semblance of a focus on bison is conspicuous at Late Promontory Phase sites from the 14th and 15th centuries. Known occupations may be indicative if some of the challenges groups faced after bison stocks became regionally depleted. However, attention is called again to the little-known Smoking Pipe site on the Provo River, unusual for its abundance of bison remains and at least some early dates that now appear contemporary with the Early Promontory

Phase (Billat 1985; Janetski 1990). Showing that for a time, bison hunters were active in Utah Valley, questions remain about whether associations can be found between this site and the Early Promontory Phase, for instance in the ceramic assemblage. Alternately, if the site represents late Fremont peoples who conducted bison hunts on an uncharacteristically large scale, the social mechanisms involved demand consideration.

Utah Valley sites also stand out for their indication that Promontory influence reached southward with time, emanating first from the area north of the Great Salt Lake. This impression is conveyed both by the chronological sequencing of Early and Late Promontory sites, and also in the replacement of south-oriented obsidian trading networks with ones that were focused on the Malad source area in southern Idaho (Janetski 2002; McDonald 1994; M. Metcalf and McDonald 2012). Little can be added to elucidate the precise nature of this relationship from the work undertaken in this study, except to note that the *in situ* development of calcite-tempered ceramics appears relatively clear between the caves and later occupations such as Chournos Springs and Orbit Inn, where a shift away from bison was underway. Additional stages of development associated with as-yet undefined social processes and demographic complexity separate the Promontory Point sites from Late Promontory manifestations in Utah Valley.

In direct relation to the assemblages examined here, a shift northward over time appears clearer, linking sites from Promontory Point and the Bear River wetlands to the Snake River Plain. A post-Formative Fremont-influenced presence has long been attested in this area, as have possible Promontory ties (Butler 1981, 1983, 1986; Cockle 2006; Gruhn 1999, 2006). At 10OA275 in the Curlew National Grasslands, fully-fledged communal bison hunters who produced calcite-tempered Promontory Gray and sand- and mica-tempered Great Salt Lake Gray (Arkush 2014, In prep.) remained active to the north a century and more after the well-dated presence on Promontory Point had ended. The continuation of both styles—a blend familiar from Caves 1 and 2, Chournos Springs, and several of the Bear River wetlands sites—speaks to the ongoing parallel development of two cultural traditions in association.

A template for mutualistic development can, of course, be found in the deep history of the Kiowa and Kiowa Apache. It is exciting to note that the gap between southern Idaho and the ancestral Kiowa homeland in the upper Yellowstone region is small, in both temporal and physical distance. A time spent west of the mountains is noted in Kiowa oral traditions, as is a general south-to-north direction of migration in the most distant period of cultural memory (Meadows 2016; Mooney 1898). It is also intriguing to consider that ancestral Kiowa and Kiowa Apache were bison hunters centuries before their arrival on the Northern Plains. For the Kiowa, this would have been a remarkable shift in subsistence, territorial range, and social networks, particularly in the pre-equestrian era. This perhaps specifies an important role for the Kiowa Apache in what for them amounted to a back migration to ground already traversed in a southward migration, following a lifestyle that had already been mastered, and where social access may already have existed.

The hypothesized diversification of Proto-Southern Dene groups west of the Continental Divide has at least two main threads, one (the Promontory) penetrating west of the Wasatch Mountains and another, perhaps main body venturing southward on the Colorado Plateau. In the Promontory thread, a further branching can be found, with one body standing out as veering northward to the Snake River while others again went south. These forks in the road fit well with linguistic data that group all Southern Dene languages as a mutually intelligible dialect chain, with the exception of the northerly Kiowa Apache (Hoijer 1971; Snoek 2015), and with the ethnographic attestation that, until relatively recently, the Kiowa Apache did not count themselves as "Apache" (Mooney 1898). The other, nascent Dismal River branch on the Colorado Plateau may have possessed many additional subdivisions (and periods of contact both with non-Dene peoples and with each other) that may be associated with the plethora of named Ndee groups in the early Spanish records. Some made their way back onto the Plains (perhaps also associating with groups that never left) and went on to become the "Plains Apache" ancestors of the easternmost Ndee (M. Hill and Trabert 2018; M. Hill et al., in prep.; Trabert et al. 2016; note also the Plains-based Llanero moiety of the Jicarilla, Eiselt 2012). Others followed an intermontane route (or routes) south to the Ancestral Puebloan world, among whom may then be found the many ancestors of the Diné.

NOTES

Notes to Chapter 1

[1] Kroeber referred to Shoshonean languages, a classification that was refuted by Sydney Lamb (1958) in favour of Numic languages as a division of Uto-Aztecan.

[2] The term 'Promontory Point' more properly refers to two specific locales: the southernmost cape of the Promontory Peninsula and to the spot where the eastern portion of the Lucin Cutoff, a train trestle (later causeway) across Bear River Bay, reaches the peninsula 2.7 km northeast of the cape (USGS 1979*a*, 1979*b*). Reflecting colloquial usage, Steward referred to the whole peninsula as Promontory Point in his 1937 work, and given that the term has entered archaeological parlance as such, it continues to be used interchangeably with the peninsula here.

[3] Likely Ray Diamond, a survivor of the Bear River Massacre who relocated to the short-lived reservation at Washakie from Cache Valley with some of the few remaining members of Chief Bear Hunter's band (Steward's "Promontory Band). Diamond lived past the age of 100 (Parry 2003:37).

[4] Other freshwater springs are noted on USGS maps to the north and east of Promontory Caves 1–4. These include Miller Springs at the head of Miller Canyon, the valley on the north side of the mountain spur on which the caves are located, about 6.4 km (4 miles) from Cave 1 and 5.6 km (3.5 miles) from Cave 3. Other high-elevation springs, as well as Indian Springs and Rose Spring on the lakeshore near Rozel Flat, where the west side of Promontory Point meets the mainland, are located farther to the north and northeast (USGS 1991*c*, 1991*d*). Miller Springs is probably the high-elevation springs reported by George and Kumeroa Chournos where they found numerous artifacts including two-handed manos and metates while excavating a dugout (George and Kumeroa Chournos, pers. comm., April 2011 and May 2013). The locale was not visited by the Promontory research team, but some artifacts from Kumeroa Chournos's collection were photographed (Figure 5.8). While they are more distant from the caves than Chournos Springs, their elevation (~1706.9 m [5600'] a.s.l.) is closer to Cave 3 (1637.4 m [5372'] a.s.l.) than the lakeside springs (1228.1 m [4226'] a.s.l.). A trail, possibly prehistoric, was observed linking Cave 2 to Cave 3 at this high elevation, and if it or another continued to Miller Springs (today there is a four-wheel-drive accessible road), the distance may have been more easily traversed than the steeper slopes to the springs below.

[5] Steward wrote: "The nearest water is seep springs at Sheehan's ranch, more than 2 miles away, and there is not the slightest reason to believe that closer water was available when the cave was inhabited," but see note above.

Notes to Chapter 2

[6] European contact was a drawn-out process in the Great Basin, beginning with the 1776 expedition of Spanish friars Atanasio Domínguez and Silvestre Vélez de Escalante to the Timpanogos at Utah Lake (Sánchez 1997:5–13; S. Tyler 1952), followed by the expeditions of American and Canadian fur traders such as Jedediah Smith and Peter Skene Ogden in the 1820s (Dale 1918; Ogden 1910). Even as late as the 1859 U.S. Army Topographical Engineers survey led by James Simpson, a decade after Mormon pioneers arrived in the Salt Lake Valley, previously uncontacted bands continued to be met in the western Great Basin (Simpson 1876:77).

[7] Simpson found it remarkable when, while traversing the western Great Basin in 1859, he interrogated a man who had "never known any chief," while elsewhere noting which Shoshone or Goshute leaders a given group might recognize (Simpson 1876:77). The line of questioning followed by Simpson betrays a nationalist sensibility that struggled to conceive a social order outside of clearly delineated nations and borders, and of which historians and ethnographers are themselves culpable when labeling and plotting ethnic, linguistic, and other boundaries (what Hu [2013:373] and J. Scott [1998] have termed "thinking like a state").

[8] By being named after the Fremont River, the prehistoric Fremont peoples are thus in turn named after John C. Frémont, who as a Brevet Captain in the U.S. Army traversed parts of the Great Basin in the early 1840s. The association is unfortunate. Despite his place in American history, Frémont also gained notoriety through his role in the May 10, 1846 massacre of the Klamath village of Dokdokwas (Roberts 2001).

[9] The catalogue record for these specimens describes them being found at Fourth Street, Salt Lake City, at a depth of four feet below surface. Judd (1926:15) believed these were the first specimens from the area to make their way into museum collections.

[10] Some authors have noted that Fremont ceramics did not necessarily "disappear"—Late Prehistoric ceramics exhibit some commonalities in production technique and overall form and may find their origins in the Fremont ceramic tradition (Dean 1992; G. Smith 2004). While globular ollas and bowls of the Promontory phase are little different from preceding Fremont types (with the exception, perhaps of size; cf. Janetski 1994), among the aspects of Fremont ceramic production that do cease to appear by A.D. 1250, if not earlier, are pitcher-type vessels with single handles. It would be interesting to examine whether there is a relationship between the discontinuation of this vessel form and Coltrain and Leavitt's (2002) postulated production of maize beer, which also would have ceased with the end of maize horticulture.

[11] Aikens (1970:105) suggests some Fremont moccasins were made from antelope hide, but antelope do not have dewclaws (O'Gara 1990:231). The comparable specimens described by Morss (1931) were made from mountain sheep.

[12] Lewis Binford (1978) would later greatly elaborate on transport strategies, butchering units, and the general utility of different portions for meat, marrow, and bone grease. Though Binford's methodology is more concise, the strategy employed by Aikens compares quite favourably with calculations of total meat, minus bones and hide, described by Reitz and Wing (2007:233) to estimate more general dietary contribution.

[13] Durrant's analysis considered specimens from different strata to be from different animals, a methodology that Grayson (1978:60) termed "maximum distinction." This methodology makes the assumption that no taphonomic mixing has occurred between strata. Though not necessarily inaccurate if preservation conditions are excellent, this tends to result in higher MNIs than when assemblages are analyzed as a whole, a methodology that Grayson (1973; 1978) termed "minimum distinction."

[14] The term De Smet used was "Diggers." For a discussion of the culturally indistinct and pejorative nature of this term in early American literature on the Great Basin, see Defa (2003).

[15] Sheahan (or Sheehan) was the previous owner of much of the Chournos family's present holdings on Promontory Point. The old barn on the property at Chournos Springs may date from this era. Other related debris, including rusted scraps of metal and horseshoes, is scattered around the site, mostly concentrated in a small dump a short distance up the trail towards South Canyon.

[16] This comparison is not without its limitations, as unlike in tightly bounded cave settings, big game hunters in open-air locations did not *need* to live time and again on top of their own middens. The vertical accumulation of bison bone in caves, then, may not be fully equivalent to open-air sites as an indication of hunting intensity, owing to a lack of potential for lateral spread—a situation analogous that faced by modern cities, where land availability has a direct effect on the choice between vertical density versus urban sprawl. Over the long term, caves may be best measured only against other caves, although the density of individual occupations or events at open-air and cave sites, unconstrained by the choice of returning to the exact same locus in future, should still be seen as a valid comparison.

[17] The approximate date AD 1350 is used here for the 600 ^{14}C BP given by Grayson (2006), a coarse estimate from an aggregation of dates for terminal Fremont occupations. A calibration of 600 ^{14}C BP using OxCal v4.2.4 with no margin of error (i.e., ± 0) yields three distinct intercepts of the IntCal13 atmospheric curve, with date ranges of 1310—1330 cal yr AD (35.2%), 1338–1361 cal yr AD (41.1%), and 1386–1399 cal yr AD (19.1%)—that is, almost any time in the 14th century AD (Bronk Ramsey 2013; Reimer et al. 2013). Many relevant dates from the terminal Fremont period used by Grayson, as in the Bear River wetlands, are of limited accuracy, sometimes in the range of ± 100, which would expand the calibrated date range to virtually any time in the 13th to 15th centuries AD. Very little confidence can be given to a median date in this range; a possible solution to this uncertainty is more dating accompanied by Bayesian statistics, as has yielded such productive results at the Promontory Caves even for specimens of uncertain stratigraphic provenience.

Notes to Chapter 3

[18] La Salle was notoriously inconsistent with his spelling, giving several different versions of Gattacka and Manrhout (i.e., Gatacka, Gataea, Marhout, and Manruth). However, the most commonly repeated transcription of the latter group, Manrhoat, was never used by La Salle, and is an orthographic error introduced by Margry, the historian who first published La Salle's letters and other autobiographical works (M. Wedel 1973:211).

Notes to Chapter 4

[19] Allison (2002:10.7) used a "highly conservative" definition of the Promontory type primarily following aspects of Steward's (1937*a*) definition of vessels with a "rough" surface finish, blackened exteriors, and white temper particles visible to the naked eye. The problematical nature of each of these criteria is discussed in Chapter 7. The vast bulk of the unclassified plain ware Allison identified at the Salt Lake Airport site shared the same temper types (quartz feldspar and opaque rock) as his Promontory type, though these tempers are not frequently found at the Promontory Caves.

Notes to Chapter 5

[20] In her report on the macrofloral analysis and charcoal identification of samples from Chournos Springs, Puseman (2015) notes that "the wood anatomical characteristics of *Allenrolfea* [iodine bush or, colloquially, "pickleweed"] and *Sarcobatus* [greasewood] are nearly identical to one another," and hence no distinction is made between them in the charcoal identifications. Greasewood is the dominant shrub cover on the alluvial fan where the site is located, and today grows within feet of the excavated area. Additionally, no charred pickleweed seeds—a wild food commonly used by Southwestern groups, including the Fremont, who parched and ground the seeds into flour (Madsen and Schmitt 2005; Moerman 1998:56)—were

recovered from bulk sediment flotation. As noted by Puseman (2015), "Although the wood of *Sarcobatus vermiculatus* and *Allenrolfea occidentalis* cannot be separated solely on the basis of wood anatomy, it is more likely that the strong wood of *Sarcobatus vermiculatus* was used by the occupants of Chournos Springs as a structural material and/or fuel wood."

[21] For an explanation of the Markov Chain-Monte Carlo algorithms employed in the application of Bayes' theorem to reduce the margin of uncertainty in batches of associated radiocarbon dates, see Bronk Ramsey 2013.

[22] The author visited the Malad obsidian source area in Oneida County, Idaho, with J.W. Ives and Brooke Arkush of Weber State University in the spring of 2013. Cobbles of obsidian are distributed on a valley floor and appear to be glacial moraine deposits; the location of the parent outcrop is not known (Brooke Arkush, personal communication, 2014).

[23] At Hogup Cave, Aikens (1970:25–26) reported that large areas of the cave appeared to have been inadvertently burned by occupants setting fires on unprepared surfaces.

[24] Following Aikens (1970), standard assumed weights for big game are 408.2 kg for bison, 62 kg for mule deer *(Odocoileus*), 55 kg for bighorn sheep (*Ovis*), and 24.9 kg for pronghorn (*Antilocapra*). Estimated dressed weights for rodents and rabbits are 1.13 kg for cottontail rabbit (*Syvilagus*), 5 kg for porcupine (*Erethizon*), 0.2 kg for wood rat *(Neotoma*), and 0.15 kg for ground squirrel *(Urocitellus*). To maintain consistency with Aikens's findings, no distinction is made in this study between male and female or adult and juvenile specimens, although it is acknowledged that the default of adult male dressed meat weights may overlook cultural preferences for younger big game, and so results in index values that overestimate the actual quantity of meat taken.

[25] Operationalizing a radiogenic strontium isotope study can be done on various scales. At the simplest, this could entail direct comparison, through mass spectrometry, of the archaeological plant specimens of interest. With isotopic fractions being inferred to reflect the localized soil and bedrock geochemistry values of growing locations, the question of whether two or more specimens grew at the same location is itself quite straightforward. This would not resolve the question of precisely where those samples grew, which would require comparison to the values of vegetation sampled from known provenances (e.g., the vicinity of the springs, other shoreline locations, and upland locations from different bedrock formations). For highest resolution, sampling would also include soil, rock, and water samples, mapping values for all local geological and pedological zones (see Hedman et al. 2009; Hodell et al. 2004). Because the research question does not pertain to strontium bioavailable in the food chain, analysis of $^{87}Sr/^{86}Sr$ signatures from small local animals (i.e., microtine rodents; Price et al. 2002) need not be conducted. Protocols for sampling, instrumentation, and controlling for diagenetic contamination are reviewed in Slovak and Paytan (2011).

Notes to Chapter 7

[26] Note that there is no rationale offered for the flat bottoms illustrated on globular Promontory and Great Salt Lake Gray ollas in Butler (1983:figs.6, 8) and D. Madsen (1986:fig. 2), and the only reconstructed Promontory vessel (D. Madsen 1979*b*:fig. 65*a*) has a rounded bottom. However, flattened bottoms *are* evident on some whole Uinta Gray loop-handled ollas and pitchers illustrated by R. Madsen (1977:fig. 24*b*, *c*, and *f*).

[27] Unlike Cave 1, Cave 2 appears to contain an extensive record of Archaic and possibly Fremont occupation prior to the arrival of the Promontory people. The ceramic sequence at Cave 2, not reviewed in this chapter, is consistent with this pattern. Like Chournos Springs, primarily quartz- and mica-tempered sherds are found early, and calcite-tempered sherds appear later (Joel Janetski, personal communication, 2018).

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Appendix A: Notes on Stratigraphic Reconciliation, Promontory Cave 1

Julian Steward (1937*a*:9-10, fig. 2) numbered strata in Promontory Cave 1 from top to bottom with the following notes:

> 1, 4 to 6 inches of cow manure (the cave could shelter several dozen head of cattle).
>
> 2, approximately 24 inches of refuse, rich in cultural remains, thinning out on the edges of the area in which most living was carried on… [i.e., Promontory culture deposits].
>
> 3, 3 to 4 inches of fibers, dust, and angular gravel, which had evidently fallen from the ceiling. No artifacts…. Under the gravel, stratum 3, is 1 inch of yellow dust, perhaps sheep manure, below which is 1 inch of charcoal and ash, then 1 inch of fibrous material, then another 3 inches of angular gravel and fiber, then 1 inch of charcoal, then 3 inches of disintegrated sheep (?) manure.
>
> 3a is like 3. Between it and stratum 4, however, are bands of charcoal alternating with layers of gravel, dipping down somewhat lower than in the central and eastern parts of the trench.
>
> 4, 20 to 24 inches of large boulders, perhaps brought down from the roof during an earthquake. A thin band of charcoal running partially under these rocks at the western end of the trench, and only 6 inches above beach gravels, may indicate human occupation during an early period.
>
> 5, 3 inches of yellow dust, apparently disintegrated sheep manure, as indicated by a number of only partially decayed lumps.

6, 10 to 12 inches of gravels, no doubt lacustrine beach deposits, which are rounded, especially toward the bottom of the stratum.

7, 16 inches of fine grayish sand, which is coarser at the bottom but is not bedded.

8, large rocks, either boulders from the roof or bedrock.

All strata excavated in the sondage appear to correspond with Steward's strata 2, 3, and possibly 3a. No layer of roof fall or lacustrine sands and gravels was observed.

Steward's stratum 1 is also absent (this is quite apparent when present, as in the profile of Trench B). No continuous layer of manure was observed in the profile or in the strata beneath it. Discontinuity of visible strata in upper left of profile suggests the latest period of Promontory occupation and any post-Promontory occupation are missing, having already been excavated by Steward.

To maintain continuity with Steward's strata in this and future excavations, but to avoid confusion between projects, Steward's numbered strata are redesignated here as lettered units reflecting periods of deposition from the bottom up, in accordance with standard practice. Subunits, some of which Steward observed and heightened excavation controls have allowed for better definition of, are numbered, again from the bottom up within each unit. Bedrock is not assigned a number, so the first unit, lacustrine material, is stratum A, with sand (Steward's stratum 7) tentatively designated A1 and beach deposits (Steward's stratum 6) A2.

Using the layer of rockfall, hypothetically extending over the breadth of the cave, as a significant chronological marker, the yellow, pre-rockfall, post-lacustrine deposits are designated B1 (Steward's stratum 5), with the charcoal layer he observed underlying the rockfall a possible subunit within this stratum). The rockfall layer itself is designated C, and post-rockfall, pre-Promontory deposits (Steward's 3 and 3a) redesignated D, with many possible subunits. Promontory deposits (Steward's stratum 2) is redesignated E, again with many possible subunits, and the overlying duff is redesignated stratum F.

Rationale for boundaries between subunits (bold lines) is based on: 1) visibility of stratified features in profile, and 2) evidence from feature notes of clear superposition.

Generally, all features with demonstrated superposition should correspond with subunits, maximizing the interpretive potential of the rigorous excavation methods. Features are grouped into subunits when they 1) are not visible in profile, 2) are lensed within or adjacent to other features, or where unconformities render superposition unclear, and 3) when multiple feature numbers (for instance, from adjacent units) are assigned to the same feature.

Subunits can be further subdivided where merited, as where excavation records note a superimposed feature that does not extend over the full excavation area (see E13a and E13b).

Subunits may also be subdivided based on arbitrary depths from field specimen records as an approximation for strata that were not noted during excavation, designated with roman numerals, i.e. E14(i), E14(ii), and so on. This may help prevent deeply excavated features from appearing 'overpopulated' in comparative analyses—note the 180 pieces of ceramic from F6/F7, for instance, that actually come from 6 or 7 visible strata.

Explanation of Strata Groups and Subunits

Strata groups A–C and F are absent in profile but observed by Steward. A-C are presumed deeper, F already excavated.

D1(?). Pre-Promontory. F75 is layer of sediment with some pebbles and gravel; no cultural material, but more likely corresponds with Steward's 3a than 6, as 2-foot layer of rock fall not encountered. Uncertain if this is actually the deepest subunit within stratum group D, which could go deeper.

D2. Pre-Promontory. F74 is yellow orange loose sediment (per Steward, decomposed dung) containing some cultural material. Stratigraphy justifies separation of subunit from D1 and D3.

D3. Pre-Promontory (dated). F73 is brownish-yellow sediment with many angular rocks and containing cultural material. Stratigraphy justifies separation of subunit from D2.

D4. Pre-Promontory (dated). F72 is calcium carbonate-speckled layer; distinction from D3 and D5 is vague.

D5. Pre-Promontory (dated). F71 is defined as "loose sediments," while F70 is a "possible use surface." Combined as subunit (shared depth and superposition). Probably affected by decomposition, but sufficiently distinct from D6; distinction from D4 less certain except for possible compaction of use surface.

D6. Pre-Promontory. F68 is yellowish sediment (per Steward, decomposed dung). Stratigraphically distinct.

E1. Earliest Promontory-era deposits (dated). F69 is a silty juniper bark layer (overlying water-saturated deposits?), F67 is dark soil with charcoal flecking. Combined as subunit (same depth range and superposition.) This layer appears to be aceramic.

E2. Promontory (dated). Yellow silt, stratigraphically distinct. Earliest occurrence of ceramics (1 sherd, 35.6 g, thick and quartz-tempered, not typical Promontory ware).

E3. Promontory, including burnt bone layer (dated). F65 is layer of dark charcoal-coloured silt (ash?) underling F62, burnt bone, and presumed here to be parts of same feature. F63 is burnt juniper bark and silt, F64 is silt lens only present in corner of excavated area. Combined as single subunit: most seem associated with burning and possibly hearth-cleaning activity. Despite unconformity in profile (possible inversion?), all are collectively stratified between E2 and E4. Earliest occurrence of Promontory Ware (3 sherds, 7.1 g).

E4. Promontory. F61 is a very hard-packed, almost calcified sediment layer. Though thin, appears to be quite stratigraphically distinct. Earliest occurrence of Knolls Gray (1 sherd, 6.3 g), only ceramic fragment present.

E5. Promontory. F59 is a layer of hard-packed silt, F60 is a layer of juniper bark and matted hair. Combined (shared depth and superposition; F59 and F58 are described in notes as distinct). Promontory Ware (2 sherds 12.9 g).

E6. Promontory, including large pieces of hide stuck in walls (dated). F58 is a "compacted layer" appears distinct in profile and in notes. Mixed ceramics (9 sherds, 34.8 g).

E7. Promontory (dated). F57 is a thick layer of juniper bark and silt. Stratigraphically distinct. Mixed ceramics (24 sherds, 128.7 g).

E8. Promontory. F53 is a silt layer underlying bone bed. Mixed ceramics (8 sherds, 46.7 g).

E9. Promontory (dated). F48 is the bone bed, originally described as loose juniper bark layer. Mostly Promontory Ware (47 of 48 sherds, 277.0 g total).

E10. Promontory (dated). F42 is an undulating, compact silty layer, while F47 appears to be the same feature. Both clearly underlie F39. Promontory Ware (13 sherds, 50.8 g total).

E11. Promontory (dated). F17 is sandy sediment below F13, identified on closing to besame feature as F34. F43 is an intermediary layer of silt lensed above juniper bark of F45. Boundaries indistinct in profile, but given overlapping depths are grouped here. F39, a compact layer of juniper bark in NE corner, and F46, a possible thermal stain, are not in profile but also occupy same depth and are also included in this subunit. Mostly Promontory Ware (20 of 24 sherds, 119.8 g total).

E12. Promontory (dated). F13 and F33 are same layer of loose juniper bark, indistinguishable in profile from F32. F30, juniper bark matting, not shown in profile, is grouped here3. Mixed ceramics (22 sherds, 77.5 g).

E13ab (dated). F12, 21, 25, and 26 are thin juniper bark and sediment layers, indistinguishable in profile and so grouped. Mixed ceramics (22 sherds, 103.8 g).

E13b (dated). F11 is compacted sediment beneath F10 and above F12. Mixed ceramics (15 sherds (63.1 g).

E14. Promontory (dated). F10 and F19 are same 10 cm-thick layer of juniper matting. Mixed ceramics (15 sherds, 61.7 g).

E15(i). Promontory. Though excavated as a single feature, F6 and F7 were excavated in arbitrary levels, resulting in a thicker 'feature' with several distinct strata viewable in profile. Arbitrary depth ranges offered as approximation of strata here. 1.70 or 1.72–1.92 m b.d. Mixed ceramics (14 sherds, 70.6 g).

E15(ii). Promontory. See F7 note above, 1.62–1.170 or 1.72 m b.d. Disturbance feature probably occurred at this time. Mixed ceramics (48 sherds, 171.6 g).

E15(iii). Promontory (dated). F7, 1.52–1.62 m b.d. Mixed ceramics (29 sherds, 118.8 g).

E15(iv). Promontory. F6/F7, 1.42–1.52 m b.d. Mixed ceramics (30 sherds, 95.0 g).

E15(v). Promontory. F6, 1.22–1.42 m b.d. Mixed ceramics (59 sherds, 209.7 g), including highest observed frequency of Knolls Gray (5 sherds) and other probable GSL Gray variants (10 sherds).