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DATA RECOVERY PLAN AND
RESEARCH DESIGN FOR SITE 42KA2044
KANE COUNTY, UTAH

DRAFT

Patricia Stavish

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DATA RECOVERY PLAN AND RESEARCH DESIGN FOR SITE 42KA2044 KANE COUNTY, UTAH

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Prepared For:

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and
State of Utah Public Lands Policy Coordination Office
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July 7, 2008

MOAC REPORT NO. 08-170

United States Department of Interior (FLPMA)
Utah Permit No. 08-UT-60122

State of Utah Public Lands Policy
Archaeological Survey Permit No. 117

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INTRODUCTION

In 2005, Montgomery Archaeological Consultants, Inc. (MOAC) conducted cultural resource inventories for the proposed Alton Coal Development Coal Hollow (Sink Valley-Alton Amphitheater) and Alton Amphitheater project areas (Stavish 2006, 2007). Combined, these cultural resource inventories resulted in the documentation of three historic sites, six multi-component prehistoric/historic sites, and 90 prehistoric archaeological sites. The Alton Coal Cultural Resource Management Plan (CRMP) addresses all phases of the potential effects to cultural resources in the Alton Amphitheater. This data recovery plan and research design will address the mitigation of archaeological site 42Ka2044, inventoried as part of the Coal Hollow project area. Although considerable effort was expended to not impact this site, Alton Coal Development has determined avoidance of this site is unfeasible and proposes impacts to the site in order to mine the coal located underneath the site and for the purposes of rerouting Lower Robinson Creek, as approved by the Utah Division of Water Rights. Site 42Ka2044 is an Archaic temporary camp with a fire cracked rock feature that has been recommended as eligible to the NRHP under Criterion D, due primarily to the potential for subsurface deposits. The site is located approximately three miles south of the town of Alton, on the northern edge of Sink Valley, immediately north of Lower Robinson Creek (Figure 1). The site is situated on both private land and public land administered by the Bureau of Land Management, GSENM Field Office.

This research design and data recovery plan is part of the Alton Coal Cultural Resource Management Plan (CRMP), a collaborative approach to state and federal undertakings with potential affects to cultural resources in the Alton Amphitheater and Sink Valley regions (Stavish 2008a). The Alton Coal project is being developed in phases on both public and private lands located in the Alton Amphitheater and Sink Valley, south of the town of Alton, Utah and includes a reasonably foreseeable transportation route that travels north from Alton along US Highway 89, west along State Route 20, and south along Interstate 15. The Alton Coal project area is divided into two separate project areas and phases of development, proceeded by separate permitting and leasing actions. The management plan will be implemented in a phased process that begins with immediate impacts to the cultural resources on private lands, and the subsequent phases of data recovery that will be conducted should a federal action proceed. Phase I consists of the mitigation of seven archaeological sites that will be impacted by Alton Coal Development's proposed Coal Hollow surface mining plan (as addressed in Stavish 2008b). Should Alton Coal Development, LLC successfully acquires the lease for the Alton Coal Tract, Phase II research would proceed. Phase II consists of an assessment of Phase I data and methods, the determination of comprehensive research questions, the development of a testing design, and the testing of eligible sites. Phase III consists of the refinement of overarching research questions and methods based on the results of Phases I and II, the selection of sites for mitigation, and the mitigation of the selected sites. It has also been acknowledged that during the mining of private and federal coal it may be necessary to identify and mitigate the effects of associated actions (pipelines, power lines, roads, etc.) as such actions are proposed during the course of mine development.

Site 42Ka2044 is such a site, for which proposed impacts are the effect of an associated action, and for which the mitigation of such effects could not be predetermined in the Alton Coal CRMP. The purpose of this data recovery plan is threefold. First, the data recovery plan serves as a research design to direct the archaeological investigations. This includes the identification and development of relevant research questions and the methods and techniques necessary to address these questions. Second, the plan outlines the methods and techniques that will be used during mitigation, in the laboratory, and during analysis of the data collected. Third, the data recovery plan addresses reporting results, curation, and dissemination parameters for all portions of the data recovery.

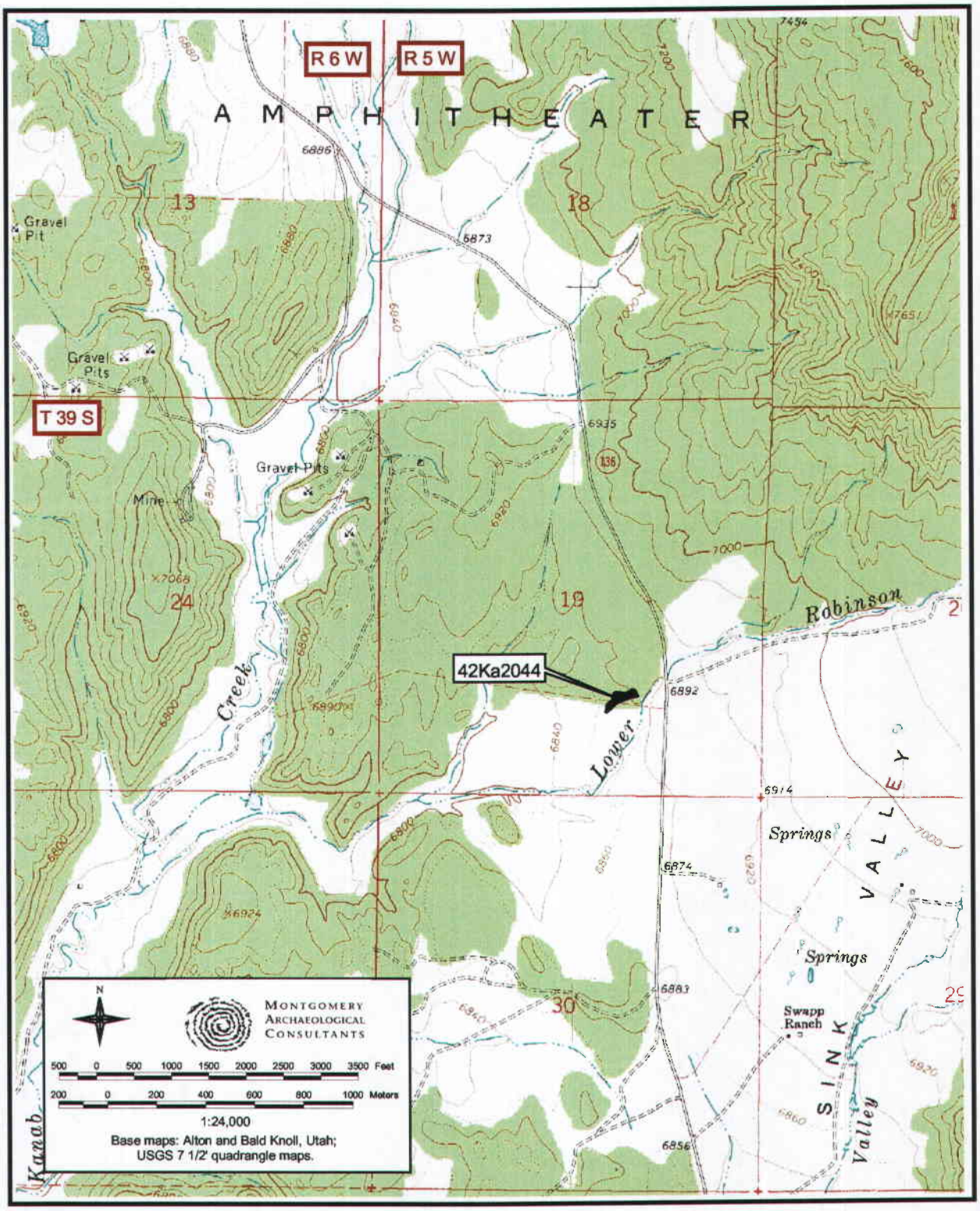

Figure 1. Location of Site 42Ka2044, Kane County, Utah.

ENVIRONMENTAL SETTING

The study area lies within the Grand Staircase Section physiographic subdivision of the Colorado Plateau (Stokes 1986). This area is characterized by a series of cliffs and terraces that rise from the Grand Canyon in Arizona to the summit of the High Plateaus in Utah. This section is bounded on the east by the East Kaibab Monocline, on the west by the Hurricane Fault, on the north by the edges of the various high plateaus, and on the south by the Grand Canyon of Arizona. Harder rock layers create cliffs and accompanying benches and tablelands, whereas the softer rock units have eroded into slopes and badlands. Specifically, the project area is located along the western edge of the Paunsaugunt Plateau. The Alton Coal Field is comprised of relatively horizontal bedrock units of Mesozoic age (see Stavish 2006: Appendix C). Within portions of the project area, bedrock units are exposed as low hills and along the incised drainage of Kanab Creek The exposed bedrock units include, from the oldest to youngest, the Winsor member of the Carmel formation (Jurassic), the Dakota formation (Cretaceous), and the Tropic shale (Cretaceous). Table 1, in Appendix C, summarizes the possible effects of surficial and bedrock units of the distribution of cultural resources in the area. The two most prominent geologic units are alluvium and Tropic Shale. The horizontal deposition of the geologic formations coupled with the impact of water and wind erosion has reduced much of the area to flat ridges and benches which are dissected by long alluvial drainages and tributaries. Drainages often widen to form meadows, such as Sink Valley and the Alton Amphitheater. Alluvium, derived from weathered bedrock, is extensive throughout the project area along the broad, open areas of cultivation and valley floor. Characteristics of the alluvium include the location of low, relatively level areas of the project area, including cultivated fields, incised arroyos, and drainages. According to Lamm (Stavish 2006: Appendix B), total depth of the alluvium is not known and likely varies across the project area. Soils in the drainages have some agricultural potential as a result of their sand, gravel and silt composition and the presence of limestone and arkosic minerals (Gregory 1951:12).

The possible natural impacts to cultural resources distributed on the alluvium include localized slope failure/collapse of arroyo walls, piping of finer grained sediments, entrenching of drainages, and the potential for buried cultural resources (see Stavish 2006, Appendix C). Cultural resources distributed across the Tropic shale formation are potentially impacted by localized slope failure, surficial creep on steeper slopes, slope wash on steeper slopes, and erosion of weathered bedrock slopes on steep to gentle slopes. Furthermore, the vertical erosion of sediments formed in situ on exposures of the Tropic shale may also distort the integrity of buried cultural resources (Ibid.).

Elevation in the project area ranges from 6800 ft (2079 m) to 7200 ft (2202 m). Climatic patterns are based on a 59 year record (1915 to 1974) from the Alton, Utah, weather station (Halbirt and Gualtieri 1981:8). The average monthly temperatures are generally mild and follow a modal distribution with a low of 26°F during January and a high of 65°F during July. The number of consecutive frost-free days average between 84 to 104 days (Gregory and Moore 1931). This period is shorter than the necessary 100 to 120 frost-free days required to mature modern hybrid corn, and more time is needed under dry conditions (Crosswhite 1981). The vegetation over most of the study area is a pinyon-juniper and sagebrush community. Pinyon-juniper with oakbrush associations occur on the tops and slopes of ridges, while a sagebrush community exists within alluvial flood plains, draws, and meadows. Other plant species which may have been utilized by ethnographic and prehistoric groups in the area include: barberry, canyon grape, cattail, currant, goosefoot, onion, prickly pear cactus, sedge, squawbush, sunflower, and yucca (Ibid:10). Today less than two percent of the area is under cultivation and products consist primarily of alfalfa,

potatoes, and cold weather vegetables. Major drainages in the project area are Kanab Creek , Sink Hole Valley Wash, and Lower Robinson Creek. Kanab Creek flows from north to south through the project area forming an incised canyon, and eventually empties into the Colorado River byway of the Virgin River. In addition, water resources are manifested as geologic aquifers or springs. Most of the springs are perennial and are derived from the Tropic Shale formation. Modern impacts of the landscape include ranching, agriculture, coal mining, and roads.

CULTURAL SETTING

Previous Archaeological Work

A record search for previous projects and cultural resources was conducted at the Utah State Historic Preservation Office, Salt Lake City on March 25, 2005 by Ms. Marty Thomas. Intensive cultural resource investigations have taken place in the area since the 1980s; however, numerous archaeological sites have been recorded since the 1970s. The majority of the eleven identified inventories were conducted by the Museum of Northern Arizona or Bureau of Land Management and are mostly related to proposed mining activities.

In 1974, the Museum of Northern Arizona (MNA) performed clearance of 48 drilling locations and access routes on the Skutumpah Terrace in Kane County; 19 drilling locations and access routes in the Alton Amphitheater in Kane County; and four meteorological tower sites in Kane County (Davidson et al. 1974). Thirty-six archaeological sites were documented during the investigations

In 1979-1980, MNA conducted inventories for Utah International, Inc.'s coal mining lease area situated on the Skutumpah Terrace and Alton Amphitheater (Halbirt and Gualtieri 1981). The four surveyed parcels were designated Alton East and Alton West, the coal preparation plant site, and major road routes. A total of 107 archaeological sites, most of which were of prehistoric affiliations, were documented dating from the Archaic to Late Prehistoric.

In 1980, the Bureau of Land Management (BLM) Kanab Field Office performed a Class III inventory of Engineers International, Inc. seismic testing areas (McFadden 1980). No cultural resources were located in the project area. The BLM performed a cultural resource inventory in 1981 of a tract allotment for Heaton Brothers (McFadden 1981). No archaeological sites were documented during the project. The Cone allotment chaining area was surveyed by the BLM in 1982, resulting in a finding of no cultural resources (McFadden 1982).

In 1984, the BLM surveyed the Syler Knoll chaining area for cultural resources (McFadden 1984). Previously recorded site 42Ka2045, a large lithic scatter containing diagnostic artifacts, was located within the project area. Because 42Ka2045 was previously evaluated as not significant (for eligibility to the NRHP), clearance was recommended for the chaining activities.

In 1986, MNA performed cultural resource inventories of 43 drill locations and access roads within the Alton Coal Field for Utah International, Inc. (Weaver 1986). Two new archaeological sites, located outside of the current project area, were documented. Also in 1986, MNA performed survey and monitoring of nine test pit locations and access routes for Utah International, Inc. (Weaver and Hurley 1986). No new cultural resources were documented.

In 1986, MNA returned to the Alton Coal Leasehold to survey another 12,500 acres, resulting in the documentation of 103 additional sites (Keller 1987). The prehistoric sites are described as typically surface lithic scatters emphasizing biface thinning technology and projectile point use and also to a lesser extent grinding slabs, manos, and large unifacial chopping tools. Keller (1987) speculates that there is a considerable degree of similarity between the exploitation patterns of cultural periods, with a concentration on deer hunting and pinyon seed gathering.

In 1987, the Museum of Northern Arizona (MNA) surveyed 22 auger borings and 27 backhoe test pits for Utah International, Inc. (Weaver and Hurley 1987). In 1993 and 1994, Nielson Consulting Group and Timpanogos Research Associates performed cultural resource inventories and site evaluations of several abandoned mines in central and southern Utah (Hughes et al. 1994). None of the mines are located in the current project area.

A stratified probability sample inventory of the Kaiparowits Plateau was conducted in 1998 and was designed to provide information on the density, distribution, and diversity of cultural resources in the region (Geib et al. 2001). This survey identified prehistoric remains dating from the early Archaic through the Protohistoric; including Archaic, Fremont, Anasazi, and Late Prehistoric (likely Southern Paiute). While Archaic sites were numerous across the survey area with abundant cultural remains, small Late Prehistoric sites containing few cultural remains were identified to have the greatest density. Sites attributed to the Archaic period are dominated by hunting camps. Importantly, the authors note that many Archaic sites on the Kaiparowits Plateau appear to be mainly surface phenomena and appear to have little potential for buried cultural remains (Ibid.:365). Residential and hunting camps were identified with equally high frequency for the Fomative period, and together represent more than half of the identified Formative period sites. Of the identified Late Prehistoric site types on the Kaiparowits Plateau, hunting camps were identified with the greatest frequency (Geib et al. 2001).

In June and July 2005, MOAC conducted a cultural and fossil resource inventory of Alton Coal Development's project area in the Alton Amphitheater, south of the town of Alton, Utah (Stavish 2007). The inventory resulted in the documentation of 31 previously recorded archaeological sites and 60 new archaeological sites. The previously recorded archaeological sites include one historic site (Alton Cemetery); three multi-component prehistoric/historic sites; and 27 prehistoric sites that consist of temporary camps, artifact scatters, and lithic scatters. The new archaeological sites include two historic sites (a corral and a bridge); two multi-component prehistoric/historic sites; and 56 prehistoric sites that consist of temporary camps, artifact scatters, and lithic scatters. The inventory also resulted in the documentation of 30 new paleontological localities and three previously documented paleontological localities (Stavish 2007). In August 2005, MOAC completed a survey of six coal seam drill sites for Alton Coal Development; no cultural resources were found (Thornton and Montgomery 2005).

In 2007, the Bureau of Land Management, Kanab Field Office, conducted a cultural resource inventory of additional lands associated with the Alton Coal Area of Potential Effect (APE) (Zweifel 2007). The inventory resulted in the documentation of 14 archaeological sites (42Ka3170-42Ka3172, 42Ka3174, 42Ka3175, 42Ka6351-42Ka6354, and 42Ka6357-42Ka6361). Two of these sites (42Ka6358 and 42Ka6259) are located outside of the current APE and are not included in the project area.

Regional archaeological investigations conducted in the vicinity of the project area include investigations at the Red Cliffs Site (Dalley and McFadden 1985), the Little Man Archaeological site on the Virgin River (Dalley and McFadden 1988), along SR-9 (Horn 1991), the Washington City-Green Spring Project (Westfall et al. 1987), the Interstate 15 within the Middleton to Snowfield Interchange project (Westfall 1991), and at Quail Creek (Walling et al. 1986). These sites consist mainly of Pueblo I and Pueblo II Virgin Anasazi habitations. In addition, a single Archaic site and 17 Paiute sites were examined at the Quail Creek locality. During the Washington City-Green Spring Project conducted by Abajo Archaeology in 1986, six rockshelters and seven hearth features were excavated (Westfall et al. 1987). This investigation revealed a series of residential camps, specialized resource procurement and processing camps, and transitory camps, occupied by Virgin Anasazi groups (Pueblo I and Pueblo II periods), and by Southern Paiute groups. Fourteen sites were investigated along Interstate 15 within the Middleton to Snowfield Interchange project area. These sites include four prehistoric and 10 historic resources. Test excavations at the prehistoric sites indicated that site 42Ws1220 is a multicomponent Archaic, Virgin Anasazi and Southern Paiute camp, site 42Ws2364 is a lithic scatter of unknown cultural affiliation, site 42Ws2394 is a resource processing camp of unknown cultural affiliation, and site 42Ws2395 is a Virgin Anasazi (Pueblo I) habitation. Large excavation projects have been completed for the Kern River 2003 Expansion Project (Reed et al. 2005), at Sand Hollow (Talbot and Richens 2002) and Corral Canyon (Roberts and Eskenazi 2006). Numerous small sites have also recently been excavated in the St. George Basin including 42Ws2871 and 42Ws2872 (Patterson 2006), 42Ws4283 (Kinnear-Ferris et al. 2005), 42Ws1809 (Eskenazi 2006), and 42Ws2556 (Eskenazi 2005).

To summarize, cultural resource projects conducted in the vicinity of the current project area have yielded evidence of prehistoric and historic sites. Prehistoric site types include lithic scatters, lithic quarry/workshops, residential camps, specialized resource procurement and processing camps, transitory camps, and habitations. Cultural affiliation of these sites is attributed to Archaic, Virgin Anasazi, and Southern Paiute peoples.

Cultural Overview

Human occupation in the region represents the Paleoindian, Archaic, Formative, Protohistoric, and Historic cultural stages. The first Native American occupation of the general study area probably occurred during the Paleoindian stage at the late glacial Pleistocene-Holocene boundary (ca. 11,500 B.P. - 9000 B.P.), though no Paleoindian sites have been documented in the Alton Coal project area. The Archaic stage (7800 - 500 B.C.) is generally viewed as a hunting-gathering lifeway, that is further chronologically divided into the Early, Middle, Late, and Terminal phases. The Formative stage began about A.D. 500, when ceramics were generally used on the Colorado Plateau, and continued until A.D. 1300. Within the region, this stage encompasses two different cultures: the Fremont and the Anasazi, which is divided into two recognizable branches the Virgin Anasazi and the Kayenta Anasazi. Protohistoric occupation of the project area is attributed to the Southern Paiute, members of the Numic population. The first documented entry of European Americans into Kane County was the expedition of Fathers Francisco Atanasio Dominguez and Silvestre Velez de Escalante in the autumn of 1776; however, Mormon settlement in the Upper Kanab (later Alton) area was firmly established in 1865. Site 42Ka2044 is affiliated with the Archaic Stage and therefore the cultural history of this period is described below. For further description of the Alton Coal project area cultural history see the Alton Coal Cultural Resource management plan (Stavish 2008a).

Archaic Stage

The Archaic stage (7800 - 500 B.C.) is generally viewed as a hunting-gathering lifeway that is represented by subsistence practices more labor-intensive than those of Paleoindians with a greater number of smaller animal and plant species being intensively exploited. Several cultural sequences for the Archaic stage are proposed on the basis of regional differences. Jennings (1978) provides a concept of the western Archaic, or Desert Culture, based on diverse resource exploitation, diagnostic artifacts including cordage and basketry, and artifactual variability in various regions such as the California-Nevada axis and Utah-Oregon axis. Matson (1991) presents a four-period sequence model incorporating data from the Greater Southwest: Early (7800 - 4000 B.C.), Middle (4000 - 2000 B.C.), Late (2000 - 1000 B.C.), and Terminal (1000 B.C. to roughly A.D. 700). Immediately east of the project area, Geib et at (2001) outlines the following four period sequence for the Western Kaiparowits Plateau: Early Archaic (9000 B.P. to 6000 B.P), Middle Archaic (6000 B.P. to 4000 B.P.), Late Archaic (4000 B.P. to c. 2000 B.P. or the adaptation to agriculture), and the Terminal Archaic (2000 B.P. to A.D. 500).

South of the study area, the Early Archaic period is labeled the Desha Complex known for its crudely made, shallow, side-notched lanceolate points. In the Glen Canyon region excavations from Sand Dune and Dust Devil Cave provide a radiocarbon date of 5050 to 6050 B.C. (Lindsay et al. 1968). About a dozen projectile points were recovered from the lower layer in Sand Dune Cave including Pinto Series, Jay, and varieties of side-notched points (later classified as Sand Dune Side-notched) (Matson 1991:147). Faunal remains recovered from the Desha Complex include those of mountain sheep, cottontail, pack rat, and lesser numbers of jackrabbit, gopher, squirrels, skunk, and bison (one bone). At Dust Devil Cave, the earliest Archaic component (Stratum IV) provided a date from a yucca-lined pit of ca. 8793 B.C. along with an abundance of prickly pear cactus (*Opuntia*) extracted from human feces (Ambler 1996:42). Significant materials recovered from this cave included 25 Archaic sandals, classified into three basic types; open-twined, fine warp-faced, and coarse warp-faced (Ibid 44). On the northern Colorado Plateau the earliest Archaic component is dated at Cowboy Cave (42Wn420) between 7430 and 7100 B.C. although no artifacts were found in this stratum (Schroedl and Coulam 1994:11). The upper Early Archaic component (Stratum III 5250 - 4350 B.C.), however, contained 11 projectile points (Pinto, Northern Side-notched, and Elko Corner-notched), faunal remains (cottontails, jackrabbits, porcupine, and *Canis* sp.), and floral remains (sunflower, sand dropseed, chenopods, cactus, juniper and bugseed) (Jennings 1980). The most significant features from Stratum III were a number of depressions referred to as "scooped out troughs" by Jennings (1975:9), more recently redefined by Schroedl and Coulam (1994:6-7) as pitstructures which were repeatedly cleaned out and reoccupied during the Early Archaic. In the Alton West Coal leasehold previous investigations have documented several Early Archaic projectile points types (Pinto Series, Humboldt, and Northern Side-notched) from sites which include later Formative and Late Prehistoric temporal components (e.g. 42Ka2045 and 42Ka2056) (Halbirt and Gualtieri 1981).

During the Middle Archaic period (4000 - 2000 B.C.) there was a decrease in the occupation of the Colorado Plateau, presumably caused by the Altithermal climate, which may have been a two drought event (Matson 1991:165-166). Many of the previously mentioned sites (Dust Devil Cave and Cowboy Cave) exhibit a reduced intensity of occupation during the Middle Archaic period. Recent radiocarbon data from the Glen Canyon region are filling the Middle Archaic gap (e.g. 1,000 years) as proposed by Berry and Berry (1986) for the Colorado Plateau indicating that the hunter-gatherers of the area may have not completely abandoned the area 6,000 years ago (Geib 1996:32). Middle Archaic settlement patterns most likely reflect the response to a probable

protracted drought by populations shifting residential camps to water-rich lowlands and especially higher elevation settings (above 8,000 ft). Common projectile points at Middle Archaic sites are Sudden Side-notched, San Rafael Side-notched, Hawken Side-notched and Elko Series. Previous investigations in the Alton West Coal leasehold have identified such point types as Sudden Side-notched from sites which include other Archaic periods and later temporal components which appear to represent residential camps and processing camps (Halbirt and Gualtieri 1981).

The Late Archaic period began around 4,000 years ago and corresponds to a noticeable increase in radiocarbon dates in the region and is temporally correlated with an increase of effective moisture what is termed as the sub-boreal interval (Berry and Berry 1986). This period is marked by a heavy reoccupation of Cowboy Cave starting at about 1750 B.C. and is characterized by the inhabitants engaging in broad-scale hunting and gathering with an increased emphasis on mountain sheep and chenopods/amaranths (Matson 1991:171). Gypsum projectile points comprised approximately 30 percent of the total identifiable collection from Cowboy and adjacent Walters Cave (Jennings 1980:36). These stemmed points are among the most common type of point found in southeastern Utah and appeared on the northern Colorado Plateau sometime after 2550 B.C. (Holmer 1986:105). Split-twig figurines are another important diagnostic of the Late Archaic period, best known from Cowboy Cave, but occur over a broad territory centered on the Colorado River and it tributaries. Farther south in the Glen Canyon region, Late Archaic occupations are less represented, although a few Gypsum points were recovered from Dust Devil Cave (Geib and Ambler 1991). On the Kaiparowits Plateau, Late Archaic sites are represented primarily by residential camps situated in the higher elevations with access to ample water, fuel wood, large and small game, and plant resource diversity whereas the limited activity camps and reduction loci are prevalent in the lower elevations that contained a greater abundance of economic grasses (Geib et al. 2001:367). Investigations at the Arroyo Site (42Ka3976) situated in the Grand Staircase-Escalante National Monument revealed a potential pitstructure exposed in a trench below a Formative horizon, dated to circa 1850 B.C., may attest to a semi-permanent occupation of the floodplain environment (McFadden 2000:15). In the Alton West Coal leasehold several Late Archaic Gypsum projectile were recorded at open sites with other older and more recent prehistoric temporal components (42Ka2047 and 42Ka2059) (Halbirt and Gualtieri 1981).

The Terminal Archaic period (1000 B.C. to roughly A.D. 700) is marked on the northern Colorado Plateau by the presence of arrow points and shafts along with the introduction of corn. The Archaic-Formative transition at Cowboy Cave is found in two separate episodes of occupation beginning about A.D. 100 during a period of high effective moisture (Schroedl and Coulam 1994:23). This relatively intense occupation (Stratum Vb) appeared to have represented a late summer/early fall seed processing locale based on the coprolite evidence (Hogan 1980). A corn cache as well as corn kernels were found in this horizon revealing that the pre-Formative occupants were growing this domesticate, although the extent of agricultural dependency is unknown. It is well established that corn dates to at least 1200 B.C. across much of the southern portion of the Colorado Plateau with later dates derived from sites farther north (Geib 1996:54). Even if the populations in the study area were not actively involved with farming, they were likely in contact with farmers or were a least experiencing changes resulting from the presence of nearby farmers. At Hog Canyon Dune (42Ka2574), located at the junction of Hog and Kanab creeks about two miles north of Kanab, charred corn kernels were recovered from a pitstructure in association with a hearth and a burial yielding two dates: 910–390 B.C. and A.D. 60–640 (Janetski 1993:229). The dating of bow and arrow introduction to the eastern Great Basin and Utah has been an issue of continuing debate.

Past evidence from the lithic technologies between the terminal Archaic and Basketmaker II populations indicates that by ca. A.D. 100 the bow and arrow was employed by the ancestral Fremont, while the ancestral Anasazi continued to employ the atlatl. In the northern portion of the region, at Cowboy Cave, arrow points come from preceramic Stratum V deposited about A.D. 100-600 (Schroedl and Coulam 1994). To the south, the Sunny Beaches site (42Ka2751) in the Glen Canyon Recreational Area is somewhat of an anomaly. A number of Rose Spring Corner-notched points, which are accepted markers of bow and arrow technology dated earlier (e.g. around A.D. 100) than the established chronology for Basketmaker II aceramic occupations. In the Alton Coal Leasehold previous inventories have documented Rose Spring Corner-notched arrow points from several sites. At site 42Ka2056 both Early Archaic Pinto Series points and Rose Spring Corner-notched points were found, but in two separate lithic assemblage loci (Halbirt and Gualtieri 1981:85).

SITE DESCRIPTION

42Ka2044

The site is temporary camp of Archaic temporal affiliation located on the top of a low ridge immediately northwest of Lower Robinson Creek. The site dimensions are 40 m by 160 m with an approximate site area of 5027 square meters (Figure 2). The site is situated within the Upper Sonoran Life-Zone and includes pinyon, juniper, low sagebrush, and bunch grasses. The site is bisected by a two track road and fenceline that run roughly east-west and the southern portion of the site, situated on private land, appears to have been chained or the vegetation and ground surface otherwise altered. The site consists of a possible thermal feature, chipped stone tools, and lithic debitage. Chipped stone tools include a utilized quartzite flake (Tool 1), a quartzite core (Tool 2), and a red chert Rocker Side-notched projectile point (Tool 3). The debitage (n=149) is dominated by shatter, while secondary and tertiary flakes are common and primary flakes are rare. Lithic material types include a wide range of colored and mottled chert, quartzite, and a small amount of obsidian. The site also contains three collectors' piles of 100+ flakes in total. Feature A is a possible thermal feature that consists of a semicircle of firecracked rock and a heat-treated flake; the quartzite core is nearby. The soil does not appear to be discolored and no charcoal was observed; however, the sediment appears to be disturbed by rodent activity. 42Ka2044 is recommended as eligible to the NRHP under Criterion D, as the site is likely to provide further information to the prehistory of the area. Although the site appears to have been vandalized by a collector, it appears to retain the potential for subsurface cultural fill.

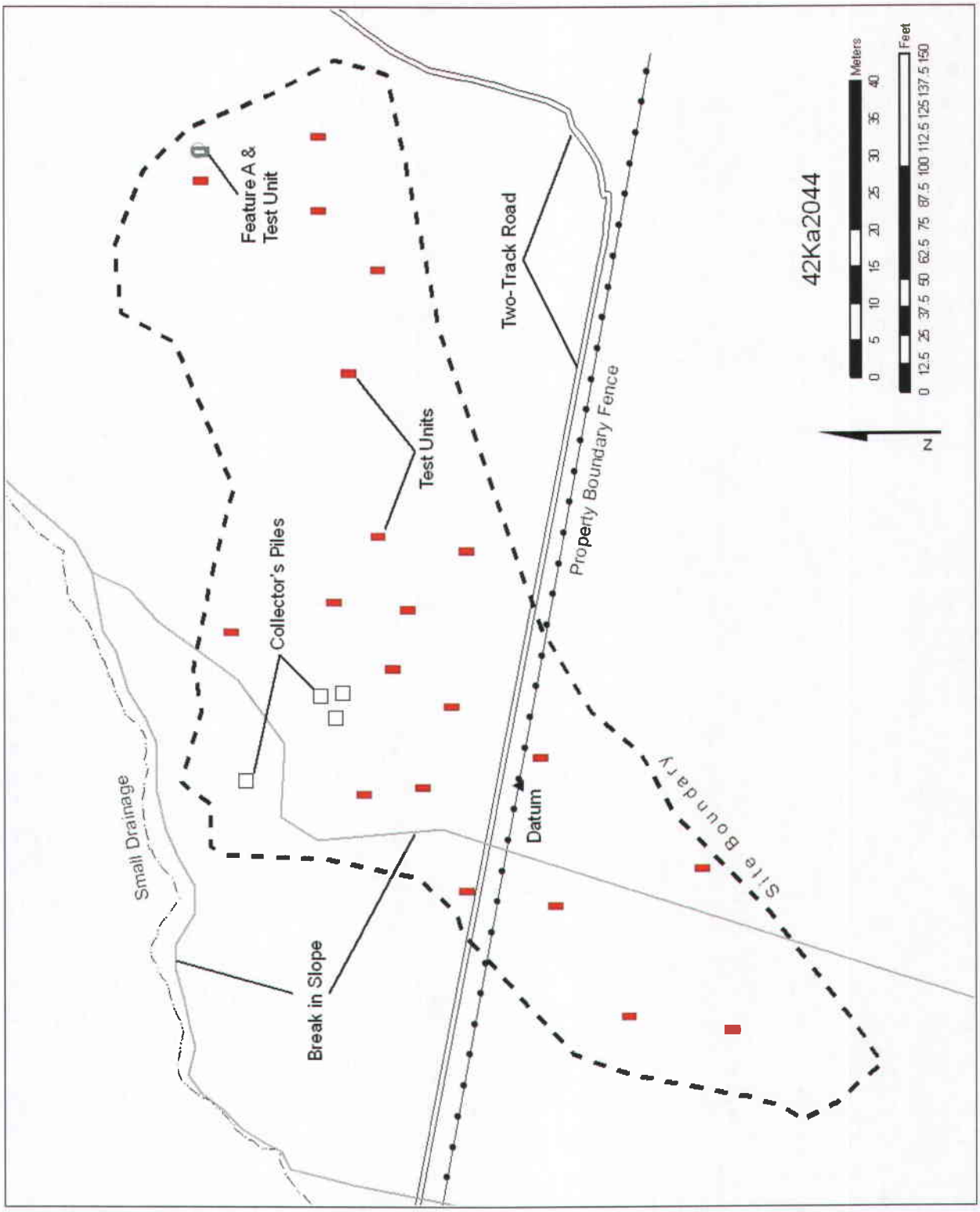

Figure 2. Site Map of 42Ka2044.

RESEARCH DOMAINS AND QUESTIONS

Inevitably research programs, whether academic or mitigation, are guided by some general or specific theoretical framework. In the case of many mitigation efforts in Utah, an emphasis is placed on a series of research domains which include cultural affiliation and chronology, site function, site structure, technology, subsistence, interaction, settlement, site formation processes, and ideology (eg. Ahlstrom et al. 1999; Firor et al. 1998; Tipps 1995; Tipps et al. 1996; Westfall 1987; Westfall et al. 1987; among others). The systematic approach, introduced to archaeology by Binford (1965), conceptualizes different components, or subsystems, of a society and analyzes them separately and then as part of the entire system. Redman (1973:62) outlines a systematic organizational strategy for field investigations that includes four fundamental principles: 1) the explicit use of both inductive and deductive reasoning in the drafting of research designs; 2) programmatic and analytical feedback; 3) explicit utilization of probability sampling; and 4) the formulation of analytical techniques that are appropriate to the hypotheses and the subject matter. Although Redman developed this strategy for use in areas with little, if any, previous archaeological investigation, the scheme, with little modification, works well with complex cultural resource management projects, such as this one. The four principles are then applied to a multistage sampling design that includes general reconnaissance (Stage 1) of the region, intensive survey (Stage 2), a controlled surface collection (Stage 3), and excavations (Stage 4) (Redman 1973:64). Previous work in the Alton Amphitheater includes general reconnaissance and an intensive survey (see Previous Archaeological Work, pages 3 and 4). The Alton Amphitheater Cultural Resource Management Plan relies heavily upon Redman's (1973) concepts of a systematic organizational strategy and multi-stage research design. In order for the data recovery to inform subsequent archaeology, we will need to collect specific data regarding geomorphology, site depositional processes, and erosional processes that have been operative at the site. These depend on both natural processes (wind and water) and human agencies (prehistoric, historic, and modern occupations).

Several working hypotheses concerning the relationship between sites in the Coal Hollow Phase I and the surrounding Alton Coal Tract have been developed. These working hypotheses include:

1. Given the similar environmental setting in the greater Alton Amphitheater - Sink Valley area, land use and subsistence strategies at temporally associated sites are similar. For example, we would expect the Archaic site (42Ka2044) to have similar technological, functional, and organizational characteristics to other sites with the same temporal affiliation in the Alton Amphitheater - Sink Valley area.

2. We expect that the natural processes active at temporally associated sites in similar depositional environments are consistent across the project area. For example, the natural processes affecting a Late Prehistoric or Protohistoric in the Sink Valley locality would be similar to a Late Prehistoric or Protohistoric site in the vicinity of Kanab Creek in the Alton Amphitheater locality.

3. We expect that temporally associated sites in similar depositional environments would have similar depositional preservation throughout the Alton Amphitheater - Sink Valley area.

Most of the archaeological information we have pertaining to the sites in and around Alton Amphitheater comes through CRM related surveys with the main objectives of locating cultural resources and determining the eligibility of the sites for inclusion to the National Register of Historic Places. These surveys identified numerous prehistoric sites consisting chiefly of lithic artifacts with no discernible structures and very few features. The lack of features may be due to the nature of the site recording, as indications of features may not be visible on the surface. Another possibility is that features do not exist or traces of them have vanished as a result of time and geomorphic processes. What survey projects have revealed, however, is a relatively long and continuous use of the Alton Amphitheater by various indigenous populations including Archaic, Fremont, Anasazi, Southern Paiute, and Ute peoples.

Research Domain 1: Artifact Distributions - Surface and Subsurface Assemblages

Artifact distribution will be examined with regard to vertical differences, thus particular attention will be paid to differences or similarities between surface and subsurface artifact assemblages. To determine if surface and subsurface assemblages are different or similar, we will use independent sample t-tests, or their nonparametric equivalent (in the event that data other than ratio level data is used). Samples to be used in testing the hypothesis include artifact frequencies, material type frequencies, and tool type frequencies. If necessary, because of multiple comparison problems resulting from the addition of more samples, an analysis of variance test (ANOVA), supplemented with Bonferonni post hoc tests will be used where multiple data sets can be tested together. Additional samples may result from more than one subsurface artifact assemblage or the addition of unexpected frequency data; however, both these instances are unlikely.

1.1. Do surface diagnostics represent overall site chronology?

1.2. In terms of artifact frequency, diversity, and richness how do the surface and subsurface assemblages differ? Are the differences significant? Are the differences related to cultural or natural processes?

1.3. Are there any characteristics of the surface assemblage that can adequately predict the subsurface assemblage?

1.4. Are the functional interpretations derived from the surface artifact assemblage supported by the subsurface artifact assemblage?

1.5. What is the depositional environment? Is it alluvial? Residual? Colluvial?

1.6 What post-depositional processes are active or were previously active that may have affected artifact distributions (slope wash, bioturbation, alluviation, devegetation/grazing)? Are the artifacts located in a primary context or a secondary context?

Research Domain 2: Chronology

We anticipate that the site will provide chronological data on the Archaic period. The chronological placement of site 42Ka2044 within the Archaic period is based on the location of a single Rocker Side-notched projectile point. The site also exhibits good potential for buried cultural remains, which during excavation may reveal further datable features and artifacts.

Efforts will be made to place the site components within previously defined cultural units as appropriate. If possible, component data will be compared to temporal periods defined for the area. Data recovery at the seven sites will focus on obtaining chronological data from cultural horizons and features that may provide further insight into cultural or temporal affiliation. Relative and absolute dating techniques, including stratigraphy, luminescence dating, obsidian hydration, and ^{14}C dating, may be employed to examine the relationship of features and diagnostic artifacts (projectile points and ceramics), and compare them to the known chronologies and cultural traditions of the region. Recovered projectile points will be identified according to the morphological classifications of Holmer (1986) and Holmer and Weder (1980). Recovered ceramics will be identified according to such classifications as Colton (1955) and Pippin (1986).

Research Questions

2.1. During what period(s) was the site inhabited or used? Are other datable materials present at the site? How well do temporally diagnostic artifacts correlate with other relative and absolute dating methods (obsidian hydration, ^{14}C dating, etc.)? Can relative and absolute dating techniques be used to place the site into the regional chronological framework (e.g. the Kern River 2003 Expansion Project obsidian hydration sequence)?

2.2. Can multiple periods of use or temporal components be distinguished at the site? Do other lines of data support the single temporal classification for site 42Ka2044?

Research Domain 3: Site Function and Use History

To understand prehistoric land-use patterns, it is necessary to determine the primary function of a cultural component/site. Although prehistoric people may have used individual sites for different activities at different times, insight into site function can be gained through analysis of represented artifact classes, artifact diversity, and cultural features. Many of the sites in the area contain artifact classes (projectile points, scrapers, bifacial knives) typically related to hunting and animal processing activities. To a limited extent the presence of ground stone at other sites in the Alton Amphitheater may suggest the processing of plant materials.

3.1. What activities can be identified as having taken place at the site? How were those activities distributed across the site? Do artifact assemblages reflect single or limited activities or multiple activities? Are activities related to resource procurement or processing? Are there distinct activity areas?

3.2. Can evidence of a distinct episode of use be identified at site 42Ka2044? Can a group of contemporaneous features, activity areas, or trash disposal areas be identified within the site? At the assemblage level, are there quantifiable differences between 42Ka2044 and the nearby sites included in the Coal Hollow research design and data recovery (42Ka2042, 42Ka2068, 42Ka6104, 42Ka6105, 42Ka6106, 42Ka6107, and 42Ka6108)?

Research Domain 4: Subsistence and Environment

Given that broad temporal occupation of the area and the diversity of subsistence practices, the types of subsistence resources utilized by the inhabitants of the site can potentially be very large. Evidence for subsistence resources will be gathered primarily from pollen, botanical, and

faunal assemblages. It is unlikely that, given differential preservation of organic materials, that the entire range of resources will be identified or that the relative proportions of the remains reflect the degree of dependence. However, the data will serve as an approximation of subsistence resources.

On- and off-site sediment samples will be taken for pollen and macrobotanical analysis and sent to Paleo Research Institute in Golden, Colorado. Pollen washes will be performed on appropriate ground stone artifacts. An additional bulk sediment sample will be taken from Feature A of site 42Ka2044 for floatation. In addition to subsistence data, the analysis of these samples will be used for comparison with generalized paleoclimate reconstructions for the Greater Colorado Plateau. If appropriate, protein and starch residues on firecracked rock will be analyzed using Fourier Transform Infrared Spectrometry (FTIR).

Research Questions

4.1. What plants and animals, wild or domesticated, can be identified as having been exploited by the site's inhabitants? What types of data do we have to assess this (protein residue, pollen wash, FTIR)?

4.2. Can we distinguish between a processing or extraction locality and whether single or multiple resources are being procured or processed? Is the site primarily related to gathering vegetal resources or animal resources?

4.3 What portions of the artifact assemblage may provide proxy data of the food items that were processed (ground stone, lithic use-wear, tool types)? What portions of the artifact assemblage may provide proxy data of the animals that were processed (tool morphology, use-wear, protein residue)?

4.4. Does site 42Ka2044, an Archaic site, more closely reflect a forager or collector strategy? How does 42Ka2044 compare to the Archaic sites 42Ka6104 and 42Ka6108, located in the Sink Valley locality? Are there any similarities between the Archaic assemblages (42Ka2044, 42Ka6104, and 42Ka6108) and the Protohistoric assemblage (42Ka6105) that may be attributable to similarities in subsistence strategies?

Research Domain 5: Technology

Technological organization will be assessed in regards to resource utilization and activities (e.g. scraping, cutting, grinding, cooking), and tool diversity. The artifact assemblage will be investigated and analyzed to determine the manufacturing technique, the raw materials used, and distinctions between the assemblage at these sites and surrounding sites. General debitage and tool analysis can aid in the determination of site function and the delineation of activity areas. Spatial patterns in the distribution of lithic debitage (and ceramics), the identification of reduction sequences, and the refitting fragmentary tools within the spatial lattice provides the data necessary to identify activity areas possibly reflecting specialized behaviors. Various site function classifications exist for hunter-gatherers (e.g. Binford 1980), semi-nomadic peoples, and agriculturists. These models may aid in the interpretation of archaeological remains, but they will be used here only as aids and not as *a priori* categories. Functional inferences concerning lithic assemblages will be drawn from direct measures of lithic diversity and richness at both the debitage and tool level, the presence/absence of certain artifact types, and tool attrition and use history.

Research Questions

5.1. Following Knell's (2004) General Nodule Analysis (GNA), does the chipped stone assemblage of 42Ka2044 reflect the production or transport scenarios proposed by Knell? Are there differences or similarities between the GNA of site 42Ka2044 and other sites located in the Sink Valley locality (42Ka2042, 42Ka2068, 42Ka6104, 42Ka6105, 42Ka6106, 42Ka6107, and 42Ka6108)? What kinds of ground stone artifacts are present? Were the flaked stone tools and ground stone artifacts manufactured from locally available materials? Is there evidence of differential use, in terms of expediency, between local and non-local tools?

5.2. How was the thermal feature at 42Ka2044 made and used? What kinds of plants were used for fuel?

Research Domain 6: Settlement Patterns and Mobility

Excavations at site 42Ka2044 will provide archaeologists with the opportunity to study the Archaic period. A key component in modeling settlement patterns is discerning the length of time that sites were occupied, and thus site variability often corresponds with the length of site occupation. Consequently, questions related to settlement patterning and mobility within an area that appears to have been continuously occupied from the Early Archaic to the Protohistoric periods depend heavily upon chronometric data and the chronological placement of sites. Kent (1992) developed an approach for comparing relative group mobility based on a variety of site characteristics; such as site size, the presence/absence of formal middens, formal storage features, diversity of ceramic assemblages, and ratios of formal flaked tools to debitage. A version of Kent's model with modifications for non-structural sites was utilized for the Kern River 2003 Expansion Project (Reed et al. 2005:70-75), which address additional site characteristics such as the mean size of firecracked rock, ceramic labor, debitage density, lithic tool reduction strategies, percentage of expedient tools, tool diversity, and faunal and floral diversity.

Research Questions

6.1. What source information can be gleaned from the obsidian at site 42Ka2044? Does the obsidian come from a single or multiple source(s)? Are there source differences between 42Ka2044 and the Archaic sites in the Sink Valley locality (42Ka6108 and 42Ka6108)?

6.2. Can we learn anything about the mobility of the group represented at the site? Although there is no simple relationship between mobility and tool manufacture, does the frequency of bifacial tools and cores suggest a residential or logistical movement? Are bifacial cores present, suggesting a preference for multifunctional, readily modifiable, and portable tools? Does the size and the diversity of the tool assemblages suggest a forager or collector strategy? Are there discernable differences in the tool assemblages between 42Ka2044 and the Archaic, the Protohistoric, and temporally unaffiliated sites located in the Sink Valley locality to suggest differences or similarities in the mobility patterns of these groups?

6.3. What can information gleaned from site characteristics such as those described above tell us about the mobility or settlement patterns of peoples who occupied the Alton Amphitheater? How do these settlement systems compare with those proposed for other sites within the region, particularly the sites associated with the Kaiparowits Plateau survey, the Coral Canyon sites, the Quail Creek area, the Kern River 2003 Expansion project sites, and the Sand Hollow sites?

SAMPLING DESIGN

The location of excavation units were selected using a simple random sampling strategy for the portion of the site located north of the two track road and fenceline (see Figure 2), which appears to have an undisturbed ground surface. The southern portion of the site, which appears to have been disturbed by chaining activities or other ground disturbing agricultural pursuits, will be explored by using a separate simple random sampling strategy. For the site, a grid system was overlaid onto the site sketch map and a random sample of units located within the site bounday, without replacement, was generated using ArcView software for both the northern and southern portions of the site. The purpose of this simple random or probabilistic sampling strategy is to maximize the chance of accuracy for making inferences about the population. In simple random sampling, each individual element (1-x-2-m grid unit) in the population (northern, undisturbed portion of the site) has an equal chance of selection, such that each unit is independent and does not effect the selection of other units. The assumptions necessary for simple random sampling are minimum (Redman 1975:150), and include the boundary of the population (site boundary as defined during the cultural resource inventory and documentation), the sampling frame (1-x-2-m grid units), and the sampling fraction. A sampling fraction is generally the percent of the sample relative to the sample universe; however, due to time and financial constraints a sample size of n=30 m^2 will be used for the northern portion of the site and a sample size of n=10 m^2 will be used for the southern portion of the site. This sampling strategy allows us to collect a representative sample of the subsurface artifact assemblage from the undisturbed portion of the site and is necessary for addressing differences between surface and subsurface artifact assemblages. Importantly, simple random sampling also provides a basis for estimating how likely our inferences about the population are wrong, as well as how much confidence we can place in these inferences (Drennan 1996).

FIELD METHODS

In order to collect the necessary data to address the proposed questions, field and laboratory methods must be compatible with one another, as well as with previous work conducted in the Grand Staircase, if larger research questions are to be answered. Additionally, data recovery at site 42Ka2044, as proposed in this research design, will be used for possible future management of the surrounding cultural resources in the Alton Amphitheater and Sink Valley regions, as addressed in the Alton Coal CRMP. As such, the following field and laboratory methods will be used throughout this project.

The first task at the site will be to produce a detailed planimetric map consisting of site boundaries, surface artifacts, features, landscape features, etc. All prehistoric surface artifacts will be collected and point provenienced with a Trimble. To the extent possible the grid will be oriented to true North. The grid system will consist of a master grid datum located at or near the northwest corner of the site. Radiating from the datum will be an east-west and north-south baseline. Grid units (2-x-2-m), are designated by the number of meters east and south of the grid datum. As such the unit designations will resemble 16S/24E or 02S/32E. Individual grid datums are designated as the NW corner of each unit, unless it is obstructed in some fashion. Once the grid is established, surface "pinch samples" for controls in pollen analysis will be collected and the surface of the site will be surveyed and artifacts will be plotted on the planimetric map.

Excavation will consist of random 1-x-2 m units, which may be expanded into larger block areas if necessary. The units will be excavated by natural layers using the control of arbitrary levels of 10 cm. However, if warranted by artifact density excavation will change to 5 cm arbitrary levels. This will allow for the archaeologist to demonstrate whether a single horizon has been turned or if multiple stratified horizons, or occupation levels, are present. All subsurface measurements will be made from the unit grid datum located in the NW corner and eventually plotted on the planview map. Excavations will cease once bedrock is encountered or one has excavated through 10-20 cm of sterile fill. At the site, at least one 1 by 2 m unit will be excavated to one meter deep or a depth necessary to obtain a sediment profile. Excavation will be done by trowel or shovel with the material removed being screened through 1/4" mesh screen, unless a smaller size screen is warranted by artifact size or density.

For site 42Ka2044, we propose excavating 15 randomly selected 1 x 2 m units placed across the northern portion of the site (north of the two track road and fenceline), one of which was placed over the location of Feature A, and five randomly selected 1 x 2 m units placed across the southern portion of the site (south of the fenceline). A minimum of 40 m^2 will be excavated at the site. If Feature A extends into adjacent units, the adjacent units will be excavated in tandem.

At site 42Ka2044, expansion of the initial random units will occur if any of the following are observed:

1. If a feature is discovered during excavation and it extends into an adjacent unit, the adjacent unit(s) will be excavated in tandem in the same method of excavation.
2. If an activity area is observed at the site, then additional units will be excavated to determine the nature and extent of the activity area. For the purposes of this research design, an activity area is defined as an increased density of artifacts that are spatially associated with a feature.
3. If multiple levels of occupation are observed at the site, and the placement of the random units does not adequately reflect multiple stratified horizons, then expansion will be conducted adjacent to the unit in which multiple horizons were observed.

Upon the completion of the excavation, all top soil removal conducted within the Coal Hollow project area will be monitored by a qualified archaeologist. In addition, monitoring will be conducted at "sensitive areas" including the site locations and areas expected to have artifacts and the heavy machinery employed for this process will remove the top soil in three inch levels in the "sensitive areas." If features are discovered, work within the vicinity of the discovery will cease until the features have been appropriately documented. Any features encountered during this procedure will be documented in a manner consistent with those identified through manual excavation.

Prehistoric artifacts recovered in situ will be three-point provenienced. If the artifact is not laying level a dip angle measurement will also be taken. If an artifact is large, such as a metate, additional provenience measurements will be taken. Tools, large sherds, vessels, articulated faunal remains, artifact concentrations, etc. will be photographed and drawn in situ. If lithic debitage or small sherd fragments are extremely numerous it may be necessary, because of time constraints, to provenience these materials by quadrant, layer, and level rather than with three point plotting. Artifacts recovered from the screens will be provenienced by grid, layer, and level. Artifacts will be given field specimen numbers at the end of each days work.

Any features uncovered during excavations will be examined, described, drawn, and photographed following recording procedures established by MOAC. Samples of soils, charcoal, bulk matrix, etc. will be taken where appropriate. If it is necessary to trace out a feature that extends into an adjacent unit, excavation of the unit, or a portion thereof, will begin immediately, following the standard excavation techniques described above, to reveal the full extent of the feature. The newly opened unit will be excavated in tandem with the original unit until sterile fill or bedrock is encountered.

Photographs will be taken prior to, during, and after excavation at the sites and excavation units. Photographs will be taken using color print, black and white print, and color slide film. Excavation unit photographs will be taken prior to excavation and a final excavation photo will be taken of at least one unit wall. Photographs will be taken of features prior to and after excavation.

Upon the complete excavation of a given unit, at least one wall will be profiled. The wall to be profiled will be determined by a number of considerations including, but not limited to, unique characteristics of the profile, clearly discernable stratigraphy, evidence of post-depositional processes, and cross-sections of cultural strata. The soil profile will consist of soil descriptions, Munsell color designations, information concerning the depositional environment, and the structure of the matrix.

In the event that human remains are encountered during excavation, all digging activity in that grid and the immediate vicinity will cease immediately. The county sheriff will be notified, followed by the Utah State Archaeologist.

LABORATORY METHODS

It is anticipated that lithic artifacts will make up the bulk of the materials recovered during excavation at site 42Ka2044. There is also a slight chance of recovering organic artifacts such as basket fragments, wood (both natural and cultural), beads, etc. No historic artifacts will be collected during the mitigation process.

Lithic Artifacts

In order to address the hypotheses, it is necessary to collect both qualitative and quantitative data on the lithic debitage and tools. General debitage analysis will consist of collecting the following variable characteristics for each artifact: material type and color, percent of dorsal cortex and type, platform type, artifact condition, the presence or absence of thermal alteration, the presence or absence of use wear, the technological artifact type, dorsal scar count, and size class.

The analysis design provides the means to collect the necessary information for determining principle reduction strategies represented at the site under investigation. Specifically, the lithic analysis will incorporate the following aspects:

1. Composition of the lithic assemblages with respect to raw materials;
2. Frequency of artifact categories including core reduction debitage, both pressure and percussion biface thinning debitage, other specialized debitage (i.e., projectile points, notching flakes, fluting or channel flakes, etc.), undiagnostic debitage and

angular debris, cores and core tools, and expedient and formal tools, including tool-producing tools (i.e., hammerstones, anvils, etc.)

3. Morphological and metric attributes of formal and informal chipped-stone tools for classification, typology, and function determination.

Where applicable, individual concentrations, or spatially discrete units, will serve as the basic units of analysis (see Analysis Section). Analysis of artifacts from sites 42Ka2044 will center on identifying specific flake types based on studies and debitage typologies devised by Ahler (1989) and Flenniken (1978, 1981). The modified typology includes the following classification scheme.

Debitage: Core reduction includes three distinct levels including primary, secondary, and tertiary reduction. Primary flakes are defined based on a percentage of 90% or higher dorsal surface cortex cover and either a cortical or single faceted platform. Secondary core reduction flakes are defined as those flakes exhibiting cortex covering between 5% and 90% of the dorsal surface and having at least one flake scar. Cortical and single faceted platforms are common and in some instances multifaceted platforms occur. Finally tertiary reduction flakes lack any cortex, have single and multifaceted platforms, but more obtuse platform angles, and a dorsal surface with several flake removal scars (two or more); generally running parallel with the long axis of the flake. The flake curvature becomes more pronounced at this stage. In all three stages of core reduction there is generally little evidence of platform preparation.

Biface thinning debitage breaks down into three categories: edge preparation, percussion biface thinning flakes, and pressure biface thinning flakes. Edge preparation flakes typically exhibit a triangular outline relative to the platform location, making them wider than they are long. Removal of these flakes generally occurs as a preliminary step in preparing the edge of a flake blank (i.e. tertiary core reduction flake) or biface blank for additional biface reduction. Characteristics of percussion biface thinning flakes include multifaceted platforms generally with some abrasion, acute platform angles, and a definite dorsal curvature. In some instances, platforms may show signs of crushing and collapsing. Pressure biface thinning flakes exhibit irregular dorsal topography, steep platform angles with lipping, pronounced dorsal curvature, and are thin and small relative to percussion biface thinning flakes. All non-diagnostic flaking debris (flake fragments, angular debris, etc.) will be grouped into a single category.

Cores: Artifacts exhibiting one or more negative bulb scars and that do not appear to have come from another material are classified as cores. Cores include three subcategories: tested nodules or cobbles, unprepared cores, and prepared cores, which display a prepared platform from which flakes are removed.

Flaked Stone Tools: For the purposes of this analysis, a lithic tool is any artifact exhibiting use-wear. As such, it is necessary to group tools into two major groups: formal and informal, or expedient, tools. The formal category includes tools formed through biface reduction, or other reduction techniques, that dramatically alter the appearance of the original flake blank. Expedient tools include used flakes and retouched flakes where neither the use nor the retouch significantly alters the shape of the blank. As used here, use-wear includes microflaking, polish, striations, battering, edge rounding, abrasion, and edge frosting. Microflaking is generally the most evident form of use-wear and one of the only forms of attrition visible to the unaided eye. Identification of striations generally requires the aid of stereo microscopes (>200 x magnification), or even scanning electron microscopes.

The analysis of utilized and retouched tools will involve assessments of type and extent of use-wear, material preferences, and the relationship between use-wear and core or biface reduction stage. Following Frison and Bradley (1980), biface production stages will be determined. Briefly, the stage reduction sequence includes biface production starting from a blank (Stage I), moving through general stages of shaping and thinning (Stages II and III) to systematic thinning and shaping (Stage IV) to the final retouching and shaping into the desired form (Stages V and VI). Bifaces need not necessarily pass through all six stages before becoming a tool. In some cases it may be necessary to repeat particular stages if the blank or preform breaks during manufacture and some stages may be omitted altogether. Classified as either blanks (Stages I-IV) or preforms (Stages V and VI), these bifaces show no evidence of use. Only those bifaces exhibiting some form of attrition are classified as tools.

A sample of obsidian artifacts will be submitted to the Northwest Research Obsidian Studies Laboratory for obsidian sourcing and hydration dates.

Ground Stone Artifacts

Ground stone encountered will be collected and bagged. Once in the laboratory, the ground stone artifacts will be examined and their attributes recorded. Because of the possibilities of obtaining pollen and traces of various residues (proteins, stable isotopes, etc.) the artifacts, particularly the use surfaces, will not be cleaned. Attributes that will be recorded for each piece of ground stone will include material type, color, manufacturing technique (if any), condition, number of use surfaces, size of use surfaces (length, width, and where applicable, depth), attrition of use surfaces (polish, pecking, battering, striations), general cross-section, function, and size (length, width, and thickness).

Ceramics Artifacts

Although ceramic artifacts are not expected to be recovered from site 42Ka2044, the following laboratory methods will be used. Information collected from ceramic artifacts includes a variety of data that, with additional statistical manipulation, should allow for the hypotheses proposed herein to be addressed. Data collected from sherds will include pottery type, temper, vessel construction, finishing technique, surface manipulation, colors, vessel form, rim diameter (for rim sherds), hardness, firing atmosphere, and weight of all ceramics of a particular type per grid unit. Additionally, a sample of ceramic sherds will be submitted to the University of Washington Luminescence Dating Laboratory for luminescence dating.

Faunal Remains

Despite the lack of remains encountered during the cultural resource inventories in the area it is assumed that more rigorous field investigation may, though it is unlikely, result in the identification of faunal remains. As such, the following laboratory analysis program is designed to collect the data necessary to address the hypotheses proposed in this research design.

First, the bone materials will be lightly cleaned by brush to remove detritus that may obscure potentially diagnostic characteristics that may aid in the determination of genus or species. After cleaning, all bone elements will be examined and recorded by laboratory personnel. More specifically, attributes that will be recorded for each element include the most specific taxon possible, the element present, the side of the element, the portion of the element present, its

apparent age, evidence of cultural and natural impacts to the element, and any additional comments deemed necessary.

Ancillary Studies

Various samples of artifacts, soils, and organics, will be sent to outside labs for analysis. Samples of charred wood will be sent to Beta Analytical for ^{14}C dating. Soil samples will be sent to Paleo Research Institute for pollen identification and counts and macrofossils. A selection of stone tools will also be sent to Paleo Research Institute for protein residue analysis. If needed, pollen washes from groundstone will also be sent there. As mentioned above, at this phase of the project an attempt will be made to identify an appropriate location for the possible placement of a pollen core sample and a sub-contractor to collect the core and conduct the analysis.

REPORTING RESULTS AND DISSEMINATION

A draft report detailing the project, the analyses, and conclusions will be submitted to Utah Divison of Oil, Gas, and Mining (UDOGM) for review. Upon receiving review and comments from UDOGM, a final report will be prepared incorporating any changes. A final document will be produced and submitted to UDOGM, the Bureau of Land Management, and the State Historic Preservation Office.

Prior to excavation, the local chapters of the Utah Statewide Archaeological Society will be invited to visit the excavations in an open house setting. Additionally, the local press will be contacted.

CURATION

All archival and prehistoric cultural materials collected or produced during the project's data recovery program will be submitted to the Utah Museum of Natural History, University of Utah, Salt Lake City, Utah.

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1998 Archaeological Data Recovery at Four Anasazi Sites on White Mesa Along US 191 in San Juan County, Utah. Alpine Archaeological Consultants, Montrose, Colorado. Project No. U-95-A1-386.

Frison, G.C. and B.A. Bradley
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Geib, P.R.
1996 Glen Canyon Revisited. *University of Utah Anthropological Papers No.* 119. University of Utah Press, Salt Lake City.

Geib, P.R., and J.R. Ambler
1991 Sand Dune Side-notched: An Early Arcahic Projectile Point Type of the Northern Colorado Plateau. *Utah Archaeology 1991* 4:17-23.

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2001 Kaibabitsinungwu: An Archaeological Sample Survey of the Kaiparowits Plateau. Cultural Resource Series No. 24. *Grand Staircase-Escalante National Monument Special Publication* No. 1.

Gregory, H.E.
1951 The Geology and Geography of the Paunsaugunt Region, Utah. *United States Geological Survey Professional* Paper 226.

Gregory, H.E., and R.C. Moore
1931 The Kaiparowits Region: A geographic and geological Reconnaissance of Parts of Utah and Arizona. *United States Geological Survey Professional* Paper 164.

Halbirt, C.D. and C.A. Gualtieri
1981 Archaeological Investigations Utah International, Inc., San Francisco, Alton Coal Field Survey, Federal, State, and Private Lands, Kane County, Utah. Museum of Northern Arizona, Department of Archaeology. Project No. U-81-NI-0254b.

Hogan, P.E.
1980 The Analysis of Human Coprolites from Cowboy Cave. Appendix IX in Cowboy Cave, pp. 201-211. In Cowboy Cave. *Anthropological Papers No.* 104. University of Utah Press, Salt Lake City.

Holmer, R.N.
1986 Common Projectile Points of the Intermountain West. In Anthropology of the Desert West: Essays in Honor of Jesse D. Jennings, pp. 89-115. *Anthropological Papers No.* 110. Universtiy of Utah Press, Salt Lake City.

Holmer, R.N. and D.G. Weder
1980 Common Post-Archaic Projectile Points of the Fremont Area. *Antiquities Section Selected Papers*, Division of State History, Utah. 7(16): 55-68.

Horn, J.C.
1991 Archaeological Data Recovery at 42Ws54 and 42Ws1226 Along State Road 9, Washington County, Utah. Report prepared for the Utah Department of Transportation by Alpine Archaeological Consultants, Montrose, Colorado.

Hughes, Nielson, and Sulz
1994 A Cultural Resource Invetory of Smirl Mine, Prospect 2A Mine, and the Alton Mine, Central and Southern Utah. Nielson Consulting Group and Timpanogos Research Associates. Report No. U-93-NP-0712. On file at the Division of State History, Utah.

Janetski, J.C.
1993 The Archaic to Formative Transition North of the Anasazi: A Basketmaker Perspective. In Anasazi Basketmaker: Papers from the 1990 Wetherill-Grand Gulch Symposium. *BLM Cultural Resource Series No.* 24, Salt Lake City.

Jennings, J.D.
1975 *Preliminary Report: Excavation of Cowboy Cave.* Department of Anthropology, University of Utah, Salt Lake City.

Jennings, J.D.
1978 Prehistory of Utah and Eastern Great Basin. *University of Utah Anthropological Papers* 98. The University of Utah Press, Salt Lake City.

1980 Cowboy Cave. *Anthropological Papers No.* 104. University of Utah Press, Salt Lake City.

Keller, D.R.
1987 A Report of Archaeological Resources on the Alton Coal Project. Report prepared for Kanab Resource Area, Bureau of Land Management as part of Utah Internationals Mine Permit Application.

Kent, S.
1992 Studying Variability in the Archaeological Record: An Ethnoarchaeological Model for Distinguishing Mobility Patterns. *American Antiquity* 57(4):635-660.

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2005 Archaeological Investigations at Sites 42Ws4283 and 42Ws4286 in Washington County, Utah. Montgomery Archaeological Consultants, Inc., Moab. Report No. U-03-MQ-0085s(e).

Knell, E.J.
2004 Coarse-Scale Chipped Stone Aggregates and Technological Organization Strategies in the Hell Gap Locality V Cody Complex Component, Wyoming. In *Aggregate Analysis in Chipped Stone.* C.T. Hall and M.L. Larson, Eds., pp. 156-183. Salt Lake City, University of Utah Press.

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1968 Survey and Excavations North and East of Navajo Mountain, Utah, 1959-1962. *Museum of Northern Arizona Bulletin* 45, *Glen Canyon Series No. 8.* Flagstaff.

Matson, R. G.
1991 *The Origins of Southwestern Agriculture.* University of Arizona Press, Tucson.

McFadden, D.A.
1980 Garkane Powerline Right-of-Way - Escalante. Bureau of Land Management, Kanab Field Office. Project No. U-80-BL-0158b.

1981 Isolated Tract Allotment. Bureau of Land Management, Kanab Field Office. Project No. U-81-BL-0230b.

1982 Cone Allotment Chaining. Bureau of Land Management, Kanab Field Office. Project No. U-82-BL-0178b.

1984 Syler Knoll Chaining. Bureau of Land Management, Kanab Field Office. Project No. U-84-BL-0679b.

2000 Formative Chronology and Site Distribution on the Grand Staircase-Escalante National Monument. Draft report on file, USDI Bureau of Land Management, Kanab Resource District, Cedar City, Utah.

Patterson, J.
2006 Data Recovery at 42Ws2871 and 42Ws2872 in Washington County, Utah. Montgomery Archaeological Consultants, Inc., Moab. On file at Division of State History, Salt Lake City.

Pippin, L.C.
1986 Intermountain Brown Wares: An Assessment. In *Pottery of the Great Basin and Adjacent Areas*, S. Griset (ed.), University of Utah Anthropological Papers, No. 3, pp.9-22. University of Utah Press, Salt Lake City.

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1973 Multistage Fieldwork and Analytical Techniques. *American Antiquity* 38(1):61-79.

1975 Productive Sampling Strategies for Archaeological Sites. In *Sampling in Archaeology*, edited by J.W. Mueller, pp.147-154. The University of Arizona Press, Tucson.

Reed, A.D., M.T. Seddon, and H.K. Stettler
2005 Kern River 2003 Expansion Project: Utah - CD Version Cultural Resource Mitigation Report. Alpine Archaeological Consultants, Montrose, Colorado and SWCA Environmental Consultants, Salt Lake City, Utah. Project Nos. U-02-A1-0565s(e), U-03-A1-0415b,f,p(e), U-02-ST-0566s(e), and U-03-ST-1127b,f,p(e).

Roberts, H. and S. Eskenazi
2006 The Coral Canyon II Project in the St. George Basin, Southwestern Utah. HRA, Inc., Las Vegas. Report No. U-02-HQ-0014(e) on file at Division of State History, Salt Lake City.

Schroedl, A.R., and N.J. Coulam
1994 Cowboy Cave Revisited. *Utah Archaeology 1994* 7 (1):1-34.

Stavish, P.
2006 Cultural Resource Inventory of Alton Coal Development's Sink Valley-Alton Amphitheater Project Area, Kane County, Utah. Montgomery Archaeological Consultants, Moab, Utah. Report No. U-05-MQ-0346p.

2007 Cultural Resource Inventory of Alton Coal Development's Project Area, Kane County, Utah. Montgomery Archaeological Consultants, Moab, Utah. Report No. U-05-MQ-1568b,p.

2008a Cultural Resource Management Plan for Alton Coal Development's Proposed Development of the Alton Amphitheater and Sink Valley, Kane County, Utah. Montgomery Archaeological Consultants, Moab, Utah. On file at Montgomery Archaeological Consultants and the Utah Division of Oil, Gas and Mining, Salt Lake City.

2008b Data Recovery Plan and Research Design for Sites 42Ka2042, 42Ka2068, 42Ka6104, 42Ka6105, 42Ka6106, 42Ka6107, and 42Ka6108, Kane County, Utah. Montgomery Archaeological Consultants, Moab, Utah. MOAC Report No. 07-136.

Steward, J.H.
1938 Basin-Plateau Aboriginal Sociopolitical Groups. *Bureau of American Ethnology Bulletin* 120. Washington, D.C.

Stokes, W.L.
1986 *Geology of Utah*. Utah Museum of Natural History. University of Utah, Salt Lake City.

Talbot, R. K. and L. Richens
2002 Shifting Sands: The Archaeology of Sand Hollow. BYU Museum of Peoples and Cultures Technical Series No. 01-5. BYU Office of Public Archaeology, Provo.

Thornton, M., and K. Montgomery
2005 Cultural Resource Inventory of the Coal Hollow Project Coal Seam Drill Sites in the Alton Amphitheater, Kane County, Utah. Montgomery Archaeological Consultants, Moab, Utah. Project No. U-05-MQ-0346b,p.

Tipps, B.L.
1995 Holocene Archaeology Near Squaw Butte, Canyonlands National Park, Utah. Selections from the Division of Cultural Resources No. 7. National Park Service, Denver.

Tipps, B.L., A.D. LaFond, and R.I. Birnie
1996 *Cultural Resource Investigations near White Crack, Island-in-the-Sky District, Canyonlands National Park, Utah.* Cultural Resource Selections No. 11. National Park Service, Denver.

Walling, B.A., R.A. Thompson, G. F. Dalley, and D.G. Weder
1986 *Excavations at Quail Creek*. Resources Series 20. Bureau of Land Management, Salt Lake City.

Weaver, D.E.
1986 An Archaeological Survey of 10 Proposed Exploratory Water Well Drill Hole Locations on the Wygaret Terrace, Kane County, Utah. Museum of Northern Arizona, Department of Anthropology, Arizona. Report No. U-86-NI-279bp.

Weaver, D.E. and Hurley
1986 An Archaeological Survey and Monitoring of Nine Test Pit Locations and Access Routes for Utah International, Inc, Alton Coal Field, Kane County, Utah. Museum of Northern Arizona, Department of Anthropology, Arizona. Report No. U-86-NI-0864b.

1987 An Archaeological Survey of Auger Borings and Backhoe Test Pits for Utah International, Inc., Alton Coal Field, Kane County, Utah. Museum of Northern Arizona, Department of Anthropology, Arizona. Report No. U-87-NI-0856b.

Westfall, D.A.
1987 The Pinenut Site: Virgin Anasazi Archaeology on the Kanab Plateau of Northwestern Arizona. Cultural Resources Series No. 4. Bureau of Land Management, Phoenix, Arizona.

Westfall, D.A.
1991 Testing and Evaluation of Selected Prehistoric and Historic Sites: UDOT Interstate 15 Middleton to Snowfield Interchange, Washington County, Utah. Abajo Archaeology, Bluff.

Westfall, D.A., W.E. Davis, and E. Blinman
1987 Green Spring: An Anasazi and Southern Paiute Encampment in the St. George Basin of Utah. *Bureau of Land Management-Utah Cultural Resource Series Number* 21.

Zweifel, M.K.
2007 Alton Coal Additions 2007. Bureau of Land Management, Kanab Field Office, Kanab, Utah. Report No. U-07-BL-0969b.

VITAE
2008

Jody J. Patterson

EDUCATION: 1994 B.A. New Mexico Highlands University (Anthropology/Sociology)
1996 M.A. New Mexico Highlands University (Anthropology/Southwest Studies)
2008 A.B.D. (Ph. D. Anthropology expected Fall 2008) University of Alaska, Fairbanks

PROFESSIONAL ORGANIZATIONS:

Utah Professional Archaeological Council
Alaska Anthropological Association
Alaska Quaternary Center
Association of American Geographers

PROFESSIONAL EXPERIENCE:

2007-Present Vice President of Research, Montgomery Archaeological Consultants, Moab, Utah
Responsibilities include laboratory supervision, archaeological research, writing and implementing sampling and research designs, supervising research-related projects.

2004 Crew Chief-Archaeologist, American Expedition to Hierakonpolis, University of Arkansas and British Museum. Responsibilities include supervision of excavation crew, burial documentation, photography, archaeological documentation.

2001-present Archaeologist, Montgomery Archaeological Consultants, Moab, Utah.
Permitted as a supervisor in Utah (statewide). Responsibilities include fieldwork (survey and testing); documentation of prehistoric and historic cultural resources; site eligibility (NRHP) assessments; laboratory analysis of artifacts; and IMACS site form and report and research design preparation.

2000 Adjunct Faculty, University of Alaska-Fairbanks, Department of Anthropology
Courses taught include: Fundamentals of Archaeology, Archaeological Field School, and Introduction to Anthropology. Also worked as a laboratory instructor and Teaching Assistant for various courses from 1998-2000.

2000 Archaeologist, Cultural Resource Consultants, Anchorage, Alaska.
Responsibilities included archaeological survey and testing, literature reviews, and report writing.

1998 Archaeologist-Project Director, University of Alaska and Wrangell-St. Elias National Park and Preserve Project. Supervised archaeology crew, conducted archaeological survey, lab work, and report writing.

1997 Archaeologist (GS-09), Wrangell-St. Elias National Park and Preserve
Conducted archaeological survey, supervised crew members, performed lab work, and report writing.

1995-1996 Archaeological Technician, Pecos National Historical Park
Lithic analyst and crew member for cultural resource survey at Pecos Historical National Park (9 Months Full Time Equivalent).

1993-1996 Archaeological Technician and Crew Chief, Northern Research Group, Inc., Las Vegas, New Mexico.
Conducted field work, supervised crew members, conducted file searches, and report writing.

1993-1995 Archaeological Technician and Crew Chief, Las Vegas Cultural Resource Management, Las Vegas, NM.
Conducted field work, supervised crew members, conducted file searches, and wrote reports.

1993 Crew Chief, Archaeological Mapping, NMHU, Department of Anthropology, Las Vegas, NM. Supervised mapping crew during the summer field season.

Professional Presentations and Presented Papers

Patterson, J. and J. Fritz
2008 Cairns, Camps, and Corrals, Historic Land Use Patterning in the Uinta Basin., Utah Professional Archaeological Council Winter Meetings, January 25-26, 2008.

Patterson, J.
2008 Expanding Assemblages in Nine Mile Canyon, Summary of Excavations at 42Dc769 and 42Cb956. Utah Professional Archaeological Council Winter Meetings, January 25-26, 2008.

Patterson, J.
2007 Beads, Baskets, and Barrow Ditches, Summary of MOAC 2007 Nine Mile Canyon Investigations. Utah Statewide Archaeological Society, Castle Valley Chapter, November Meeting (Invited).

Patterson, J.
2007 A Description and Cultural Assessment of a Flute from Range Creek: Comparisons with Prehistoric Flutes from western North America. Utah Division of State History, Prehistory Week Public Lecture (Invited).

Patterson, J.
2007 A Description and Cultural Assessment of a Flute from Range Creek: Comparisons with Prehistoric Flutes from western North America. Utah Statewide Archaeological Society, Castle Valley Chapter, February Meeting (Invited).

Patterson, J. and P. Stavish
2007 Preliminary Description and Cultural Assessment of a Flute from Range Creek, Utah. Utah Professional Archaeological Council Winter Meeting

Patterson, J.
2000 *How Far is too Far?: Quantifying Viewsheds in the Nutzotin Mountains, South-central Alaska*. Alaska Anthropological Association.

Patterson, J.
1999 *A First Approximation of a Lithic Scatter Typology in the Nutzotin Mountains, Wrangell-St. Elias National Park and Preserve*. Alaska Anthropological Association.

Patterson, J.
1998 *Late Holocene Land Use in the Nutzotin Mountains*. University of Alaska, Public Anthropology Colloquium (Invited).

1998 *Archaeological and Paleoecological Fieldwork in the Wrangell-St. Elias National Park and Preserve*. Alaska Quaternary Center Seminar (Invited).

Peer Reviewed Publications

Patterson, J.
In review Late Holocene Land Use in the Nutzotin Mountains: Lithic Scatters, Viewsheds, and Resource Distribution. Submitted to *Arctic Anthropology*.

Patterson, J., S. George, P. Matheus, and C. Martin
2001 *Upper Yukon River Region: Athapaskan Settlements*. 1:6,000,000 scale map. Fairbanks, National Park Service.

Selection of Technical Reports in Utah and Elsewhere

Patterson, J.
2007 Data Recovery and Mitigation Plan for 42Dc769, Questar's SSXP II, Duchesne County, Utah.

2007 Brief Summary Field Report-Data Recovery at 42Dc769, Duchesne County, Utah.

2007 A Testing for Nature and Extent Plan for 42Cb956, Carbon County, Utah.

2007 A Class II Inventory for Emery Mine

2007 CRI of BBC's Peter Point #15-6D-13-17, Carbon County, Utah

2007 CRI of BBC's Interplanetary Airstrip Access and Pipeline, Carbon County, Utah

2007 CRI of BBC's Prickly Pear #21-2-12-15, Carbon County, Utah.

Patterson, J., J. Fritz, K. Lower-Ekleson, R. Stash, and A. Thomas
2007 Class I Overview of Kerr-McGee Onshore's Greater Natural Buttes Oil and Gas Field Leases, Uintah County, Utah.

Patterson, J. and R. Glaab
2007 Data Recovery at 42Ws4113 and 42Ws4115, Washington County, Utah.

Whiting, J. and J. Patterson
2007 Chapter 3 and 4 Cultural Resource Sections, Uinta National Forest EIS.

Patterson, J.
2006 Data Recovery at Sites 42Ws2871 and 42Ws2872 in Washington County, Utah.

2006 Data Recovery at Sites 42Em2684 and 42Em2686 In Emery County, Utah

2006 Data Recovery at Site 42Be2189, Beaver County, Utah.

2006 An Integrity Testing Plan for 42Dc769, Questar SSXP II Pipeline, Duchesne County, Utah.

2006 Chapters 3 and 4 Cultural Resource Sections for BBC WTP Drilling EIS.

Glaab, R., J. Montgomery, and J. Patterson
2006 Cultural Resource Inventory of Questar Pipeline Company's Southern System Expansion Project II, Carbon, Duchesne, and Uintah Counties, Utah

Patterson, J.
2005 Archaeological Data Recovery at 42Ga3818 and 43In1371 Along State Route 20, Garfield and Iron Counties, Utah.

Patterson, J., and K. Montgomery
2005 Cultural Resource Inventory of Bill Barrett Corporation's Stone Cabin Access on SITLA in Carbon County, Utah.

Patterson, J. and M. Bond
2005 Eligibility Testing at 42cb2457, a Discovery Site near Flat Iron Mesa Carbon County, Utah.

Patterson, J.
2004 Bill Barrett Corporation's Stone Cabin Jack Canyon and Rims Survey, Carbon County, Utah.

2004 Cultural Resource Inventory of the Division of Wildlife Resources Little Mountain Test Annex Project, Weber County, Utah.

2004 Cultural Resource Protection, Monitoring, and Discovery Plan for the West Tavaputs Plateau Drilling Program, Carbon County, Utah.

2004 Cultural Resource Summary of BBC's Tavaputs Plateau Exploratory Drilling Program, Carbon County, Utah.

Patterson, J. and A. Whitfield
2004 Monitoring and Additional CRI of BBC Stone Cabin 3-D Seismic Program, Carbon County, Utah.

Patterson, J.
2003 Mitigation of UDOT's US 191 Improvement Project from SR 279 to SR 313, Grand County, Utah.

2003 Cultural Resource Inventory of Lone Mountain's Bar X 25 Well Location and Access, Grand County, Utah. MOAC Report 03-55.

2003 Cultural Resource Inventory of Rio Algom's Water Drilling Program, San Juan County, Utah. MOAC Report 03-37.

2003 Nine Mile Monitoring and Protection Program for BBC Well Locations in Dry and Nine Mile Canyons, Carbon County, Utah.

2003 Cultural Resource Inventory of Bill Barrett Corporation's 12-24 and 5-13 Alt. Well Location, Carbon County, Utah.

2003 Cultural Resource Inventory of Bill Barrett Corporation's Three Mile Pipeline in Nine Mile Canyon, Carbon County, Utah.

2003 Cultural Resource Inventory of Bill Barrett Corporation's Water Canyon Compressor Station, Carbon County, Utah.

2003 UDOT's Data Recovery Plan for 42Be2189, Beaver County, Utah.

2003 Cultural Resource Inventory of Bill Barrett Corporation's Dry Canyon Compressor Station, Carbon County, Utah.

2002 Cultural Resource Inventory of the RSA-USA, Inc. Marlboro Commercial Location Near Gemini Bridges, San Juan County, Utah. MOAC Report 02-68.

2002 Cultural Resource Inventory of the RSA-USA, Inc., Marlboro Commercial Location Near Dugout Ranch, San Juan County, Utah. MOAC Report No. 02-62.

2002 Cultural Resource inventory of a Portion of the Beehive-Midstate Fiber Optic Line Near Garrison, Millard County, Utah. MOAC Report No. 02-32.

2002 Cultural Resource Inventory of Brown Brothers Constructions' Material Pit Near Cainville, Wayne County, Utah. MOAC Report No. 02-05.

2002 Cultural Resource Inventory of Utah Department of Transportation's Proposed Baker Gravel Pit Near Kanosh, Millard County, Utah.

2002 Cultural Resource Inventory for MACTEC-ERS' Five Water Monitoring Well Locations Near Green River, Grand County, Utah.

2002 Cultural Resource Inventory for MACTEC-ERS' Four Water Monitoring Well Locations Near Moab, Grand County, Utah.

2002 Cultural Resource Inventory of Rock Deformation Research Inc's Proposed Sampling Areas

Along Muddy Creek, Emery County, Utah.

Patterson, J. and K.R. Montgomery
2002 Cultural and Paleontological Resources Survey of UDOT's US 191 Improvement Project Between SR 279 and SR 313, Grand County, Utah. MOAC Report No. 01-36.

Patterson, J. and K.R. Montgomery
2002 Cultural Resource Inventory of Two RSA-USA, Inc.'s Marlboro Commercial Locations in Grand and San Juan Counties, Utah

2002 Cultural Resource Monitoring of Anshutz Headwater Federal 7-15 Access Road, San Juan County, Utah.

Patterson, J.
2001 Mitigation and Data Recovery Plan for 42Ws2871 and 42Ws2872, Washington County, Utah.

2001 Mitigation and Data Recovery Plan for the Lila Canyon Rock Shelter, Emery County, Utah.

Patterson, J., M. Elkins, and K. Montgomery
2001 Cultural Resource Inventory of the New Water Utility Line for the City of Price, Carbon County, Utah. MOAC Report No. 01-87.

Patterson, J. and K. Montgomery
2001 Cultural Resource Inventory of Three Areas within the Proposed Scofield Area Coal Mine, Carbon County, Utah. MOAC Report No. 01-97

2001 Cultural Resource Inventory of the Quitchupah Coal Haul Road, Emery and Sevier Counties, Utah. MOAC Report NO. 01-82.

Patterson, J.
2000 Wiki Peak-Ptarmigan Lake 1999 Archaeological Investigations: Overview of the Work Conducted by the University of Alaska, Fairbanks Archaeological Field School. Submitted to Wrangell-St. Elias National Park.

2000 Additional Testing of Six Surface Depressions Near the Egegik Airport, Alaska. Cultural Resource Consultants, Anchorage, Alaska.

2000 Survey and Testing of the Alternative B Runway at Platinum, Alaska. Cultural Resource Consultants, Anchorage, Alaska.

Patterson, J.
1996 Plains-Pueblo Interaction at Tecolote Pueblo (LA 296), Tecolote, New Mexico. Master's Thesis, Anthropology Department, New Mexico Highlands University.

Patricia M. Stavish
Curriculum Vitae 2007

EDUCATION:

2003-2005 Masters of Science in Anthropology with a focus in Archaeology, Dec. 2005
University of Wisconsin-Milwaukee, Milwaukee, WI. Thesis: Women and Children First: The Distribution of Grave Goods at the La Tene cemetery Munsingen-Rain.

1998-2002 Bachelor of Arts Degree with a major in Anthropology.
University of Minnesota-Twin Cities, Minneapolis, MN.

PROFESSIONAL ORGANIZATIONS:

Archaeological Institute of America (AIA)
Society for American Archaeology (SAA)

PROFESSIONAL EXPERIENCE:

April-Sept 2005
Feb 2006 to Present Staff Archaeologist, Montgomery Archaeological Consultants, Moab, Utah. Responsibilities include fieldwork (survey and mitigation); documentation of cultural resources; site eligibility assessments; laboratory analysis of artifacts technical and research design reports. Skilled in a number of software packages including Microsoft Word, Excel, GPS Pathfinder and ArcView; and is proficient with the use of GPS units and related software (e.g. Trimble GeoExplorer II and III).

2004 Archaeological Crew Member, Bad Duerrnberg, Hallein, Austria. Excavation of Iron Age settlement. Tasks included retrieval of artifacts and identification of settlement features; use of total station and theodolite to record artifacts and; laboratory analysis.

2002-2004 Archaeological Field Technician: Foth and Van Dyke, Eagan, MN. Phase I, II and III archaeological survey and excavation in Minnesota and Iowa. Operation of archaeological and survey equipment.

2000 Archaeological Assistant. Minnesota Historical Society, St. Paul, MN. Excavation of the Mill City ruins (historical urban site). Collection and documentation of archaeological data; creation of scaled drawings of historic structures; operation of survey and GPS equipment.

2000 University of Minnesota-Twin Cities Field School. Excavation of historical fur trading site in Mendota, Minnesota. Skills acquired: survey methods, site mapping, excavation of test units, mapping unit floors, profiles and features.

Utah Fieldwork (Montgomery Archaeological Consultants)

2005 Archaeological Technician. Cultural Resource Inventory of Alton Coal Development, Kane County, Utah (2 months). Cultural Area: Anasazi

2005 Archaeological Technician. HDR Engineers Central Railroad Project, Sevier County, Utah (2 weeks). Cultural Area: Great Basin

2005 Archaeological Technician. Utah Department of Transportation's Data Recovery at Sites 42Sa25619, 42Sa25664, and 42Sa25664, San Juan County, Utah (1 month). Cultural Area: Anasazi

2005 Archaeological Technician. Cultural Resource Inventory of Bill Barrett Corporation's Seismic Project Near Pine Ridge, San Juan County, Utah. (1.5 months). Cultural Area: Anasazi

2005 Archaeological Technician. Cultural Resource Inventory for the Santa Clara River Bridge on Shivwits Tribal Land, Washington County, Utah (2 weeks). Cultural Area: Anasazi

2005 Archaeological Technician. Cultural Resource Inventory of 13 EOG Resources well locations, Uintah County, Utah (1 week). Cultural Area: Great Basin

2005 Archaeological Technician. Cultural Resource Inventory of 5 EOG Resources well locations, Uintah County, Utah (3 days). Cultural Area: Great Basin

2005 Archaeological Technician. Cultural Resource Inventory of Veritas Geophysical Integrity's Seep Ridge 3D seismic prospect, Uintah County, Utah (3 weeks). Cultural Area: Great Basin.

2006 Archaeological Technician. Cultural Resource Inventory of Consol Coal's Hidden Valley development parcels, Emery County, Utah (1 week). Cultural Area: Great Basin

2006 Archaeological Technician. Cultural Resource Inventory of Delta Petroleum's three well locations, Grand County, Utah (1 week). Cultural Area: Great Basin

2006 Archaeological Technician. Cultural Resource Inventory of Tidewater's four well locations, Grand County, Utah (1 week). Cultural Area: Great Basin

2006 Archaeological Technician. Cultural Resource Inventory of the Adam's mineral claims, Grand County, Utah (2 weeks). Cultural Area: Great Basin

2006 Archaeological Technician. Cultural Resource Inventory of Kerr-McKee's Ouray compressor to Bridge station pipeline, Uintah County, Utah (5 days). Cultural Area: Great Basin.

2006 Archaeological Technician. Cultural Resource Inventory of Kerr-McKee's proposed State 921-33M well location, Uintah County, Utah (4 days). Cultural Area: Great Basin.

2006 Archaeological Technician. Cultural Resource Inventory of Kerr-McKee's proposed State 921-33M well location, Uintah County, Utah (4 days). Cultural Area: Great Basin.

2006 Archaeological Technician. Cultural Resource Inventory of Kerr-McKee's proposed State 1021-36L well location, Uintah County, Utah (4 days). Cultural Area: Great Basin.

Utah Fieldwork (Montgomery Archaeological Consultants)

2006 Archaeological Technician. Cultural Resource Inventory of EOG Resources well Locations North Duck Creek 320-27, 321-27, 322-27, 323-27, 324-27, 318-33, 319-33 on Ute Tribal Lands, Uintah County, Utah (1 week). Cultural Area: Great Basin

2006 Archaeological Technician. Cultural Resource Inventory of Kerr-McKee NBU 1021-10P well location, Uintah County, Utah (5 days). Cultural Area: Great Basin

2006 Archaeological Technician. Cultural Resource Inventory of Kerr-McKee NBU 1021-7B well location, Uintah County, Utah (5 days). Cultural Area: Great Basin

2006 Archaeological Technician. Cultural Resource Inventory of Enduring Resources'10 Southam Canyon well locations, Uintah Co., Utah (1 week). Cultural Area: Great Basin

2006 Archaeological Technician. Cultural Resource Inventory of Questar E & P 13 well locations in the Wonsits Valley on Ute Tribal Lands, Uintah Co. Utah (1 week). Cultural Area: Great Basin.

2006 Archaeological Technician. Cultural and Fossil Inventory of Utah Department of Transportation's Hurricane State Route 9 / 600 North Project NH-0009(11)10E, Washington Co., Utah (2 weeks). Cultural Area: Anasazi

2006 Archaeological Technician. Additional Cultural Resource Inventory for the Southern Corridor Project, Phase I, Interstate 15 to River Road. Addendum to: Cultural and Fossil Inventory of Utah Department of Transportation's Southern Corridor Project, Washington Co., Utah (1 week). Cultural Area: Anasazi

2006 Archaeological Technician. Cultural and Fossil Resource Inventory for Utah Department of Transportation's US-89 Kanab to Kanab Creek Bridge Project, Kane Co., Utah (4 weeks). Cultural Area: Anasazi

2006 Archaeological Technician. Cultural and Fossil Resource Inventory for Utah Department of Transportation's SR-11 Ranchos Road to Landfill Road Project, Kane Co., Utah (2 days). Cultural Area: Anasazi

2007 Archaeological Technician. Data Recovery and Monitoring for Sites 42Sa20727, 42Sa21484, 42Sa21485, 42Sa24113, and 42Sa24114, San Juan Co, Utah. Utah Department of Transportation's US 191 Blanding to Moab Passing Lanes Improvement Project. (5 weeks). Cultural Area: Anasazi

LABORATORY WORK

2004 Lab Volunteer. Old World section in the Archaeology laboratory at the University of Wisconsin-Milwaukee. Digitizing field drawing from excavations in Germany.

2002-2003
Archaeological Lab Technician. Forth and Van Dyke, Eagan MN. Washed and cataloged artifacts, including both prehistoric and historical remains from surveys and excavations.

TEACHING EXPERIENCE

Fall 2005 Teaching Assistant. Introduction of Anthropological Statistics, University of Wisconsin-Milwaukee.

Spring 2005 Teaching Assistant. Introduction of Cultural Anthropology, University of Wisconsin-Milwaukee.

Fall 2004 Teaching Assistant. Introduction of Anthropological Statistics, University of Wisconsin-Milwaukee.

RESEARCH EXPERIENCE

2004 Part of a graduate student team involved in digitizing excavation drawings from the UWM "Landscape of Ancestors" project in Germany (http://www.uwm.ed/~barnold/arch/). Mortuary contexts, including burials, from two early Iron Age mounds digitized using Canvas software.

2002 Research assistant to Professor Greg Laden, Dept. Of Anthropology; University of Minnesota-Twin Cities, Minneapolis, MN. Library research on various topics of Biological Anthropology and Archaeology.

2001-2002
Research Assistant to Professor Robert Blanchette, Department of Plant Pathology; University of Minnesota-Twin Cities, Minneapolis, MN. Identification of archaeological wood samples using light microscope and digital imaging equipment.

PRESENTATIONS

December 2005 American Anthropological Association: 104th Annual Meeting, Washington, DC. Session: Materialization of Social Identity. Presentation of paper "Women and Children First: An Analysis of Grave Goods and Gender in the Iron Age Cemetery at Munsingen-Rain."

November 2004 Chacmool Gender Conference: Qu(e)erring Archaeology, Calgary, Alberta, Canada Session: Expressions of Gender Identity in Mortuary Context. Presentation of paper "Women and Children First: The Distribution of Grave Goods at the La Tene cemetery Munsingen-Rain."

TECHNICAL PUBLICATIONS (Montgomery Archaeological Consultants)

Stavish, P. and K. Montgomery

2005 Cultural Resource Inventory of EOG Resources' Proposed 3 CWU Wells: #684-1, #677-6, and #680-6 in Uintah County, Utah. Project No. U-05-MQ-0783b.

Cultural Resource Inventory of EOG Resources' Proposed 4 CWU Wells: #1039-18, #1034-19, #1035-19 and #692-20 in Uintah County, Utah. Project No. U-05-MQ-0780b.

Cultural Resource Inventory of EOG Resources' Proposed 5 Chapita Wells Units in Sections 29 and 30 of Township 9 South, Range 23 East in Uintah County, Utah. Project No. U-05-MQ-0781b.

Cultural Resource Inventory of EOG Resources' Proposed 4 CWU Wells: #1039-18, #1034-19, #1035-19 and #692-20 in Uintah County, Utah. Project No. U-05-MQ-0780b.

Cultural Resource Inventory of EOG Resources' Proposed 2 East Chapita Wells Units in Section 5 of Township 9 South, Range 23 East in Uintah County, Utah. Project No. U-05-MQ-0779b.

Cultural Resource Inventory of EOG Resources, Inc.'s Proposed Chapita Wells Unit #1065-3 (Previous #597-3), #1066-3 (Previous #543-3), and #1067-3 (Previous #542-3) in Uintah County, Utah. Project No. U-05-MQ-0778b.

Cultural Resource Inventory of EOG Resources, Inc.'s Proposed Chapita Wells Unit #1041-22 (Previous #237-22) and #1042-28 (Previous #401-28F) in Uintah County, Utah. Project No. U-05-MQ-0777b.

Cultural Resource Inventory of EOG Resources, Inc.'s Proposed Chapita Wells Unit #1036-13 (Previous #236-13), #1037-13 (Previous #338-13), and #1038-24 (Previous #328-24F) in Uintah County, Utah. Project No. U-05-MQ-0776b.

Cultural Resource Inventory of Westport Oil & Gas NBU #922-34 D, K, M and 0 Well Locations, Uintah County, Utah. Project No. U-05-MQ-0782b.

Cultural Resource Inventory of EOG Resources, Inc.'s 13 Proposed Well Locations: North Chapita #225-33, #284-6, #287-5, Stagecoach #97-8, #98-8, #99-8, #100-8, #106-8, #107-8, #108-8, CWU #982-9, #983-9, #985-9 in Uintah County, Utah. Project No. U-05-MQ-0795i.

Cultural Resource Monitoring of Westport Resources Pipeline Corridor, Carbon County, Utah. Montgomery Archaeological Consultants, Moab, Utah. BLM, Vernal Field Office. Permit No. U-05-MQ-041lb Part 2 of 2.

Cultural Resource Inventory of Portions of the Grey Wolf Parcel for the State of Utah, Division of Wildlife Resources, Duchesne County, Utah. Project No. U-05-MQ-0802s.

Cultural Resource Inventory of EOG Resources, Inc.'s Proposed Stagecoach Wells #109-7, #104-17, #80-20 and CWU #1016-16, Uintah County, Utah. Project No. U-05-MQ-0786i.

Stavish, P.
2006 Cultural Resource Inventory of Newfield Exploration's 40 Acre Parcel in Township 9S, Range 16E, Section 15, Duchesne, Utah. Project No. U-06-MQ-0349b,s.

Cultural Resource Inventory of Kerr-McGee Oil & Gas Onshore LP'S Proposed Ouray Compressor to Bridge Station Pipeline and Power Line in Uintah County, Utah. Project No. Project No. U-06-MQ-0348i.

Cultural Resource Inventory of Kerr-McGee Oil & Gas Onshore LP's Proposed State #921-33M Well Location, Uintah County, Utah. Project No. U-06-MQ-488s.

Cultural Resource Inventory of Kerr-McGee Oil & Gas Onshore LP's Proposed Well Locations State #1021-36L and #1021-36M Uintah County, Utah. Project No. Project No. U-06-MQ-0325b,s.

Cultural Resource Inventory of EOG Resources Inc.'s Proposed Well Locations North Duck Creek 320-27, 321-27, 322-27, 323-27, 324-27, 318-33, 319-33 on Ute Tribal Lands, Uintah County, Utah. Project No. U-06-MQ-0324i.

Cultural Resource Inventory of the Delta Petroleum Corporation Energy's Proposed Greentown Federal #33-12 and #35-12 Well Locations, Grand County, Utah. Project No. U-06-MQ-0288b.

Cultural Resource Inventory of Alton Coal Development's Sink Valley-Alton Amphitheater Project Area, Kane County, Utah. Project No. U-05-MQ-0346b,p.

Cultural and Fossil Inventory of Utah Department of Transportation's Hurricane State Route 9 / 600 North Project NH-0009(11)10E, Washington Co., Utah. Report No. U-06-MQ-1443b,p.

Additional Cultural Resource Inventory for the Southern Corridor Project, Phase I, Interstate 15 to River Road. Addendum to: Cultural and Fossil Inventory of Utah Department of Transportation's Southern Corridor Project, Washington Co., Utah. Report No. U-06-MQ-0946s.

Cultural and Fossil Resource Inventory for Utah Department of Transportation's US-89 Kanab to Kanab Creek Bridge Project, Kane Co., Utah. Report No. U-06-MQ-1700b,p,s.

Cultural and Fossil Resource Inventory for Utah Department of Transportation's SR-11 Ranchos Road to Landfill Road Project, Kane Co., Utah. Report No. U-06-MQ-1701p.

Stavish, P.
2007 Cultural Resource Inventory of Alton Coal Development's Project Area, Kane County, Utah. Report No. U-05-MQ-1568b,p.

APPENDIX B
Level and Artifact Recording Forms

MONTGOMERY ARCHAEOLOGICAL CONSULTANTS TESTING FORM

PROJECT: SITE:
EXCAVATORS: DATE:
TEST UNIT NUMBER: Screen mesh size:
Unit Size: Unit Orientation: Datum Corner:

Unit Description: _____

General Surface Planview:

. . .

. . . North

. . .

Is the depth below datum or MGS?
Level Number (Depth)/Description: _____

Level Number (Depth)/Description: _____

Lithic Analysis Form

Site:_____ AU#_____ Analyst:_____ Date: _____ Page ___ of ___

Cat.	Grid	Sec	Layer	Level	Mat.	Color	% Cortex	Cortex Type	Platform	Cond.	HT	Use	mm of Use	# Dors. Scars	Tech. Type	tFunc. Type	Size Class

Ground Stone Analysis Form

Site:_____ AU#: _____ Analyst:_____ Date:_____
Page__of__

Cat #	Prov.	Mat.	Color	Manufacture	# Use Surface	Size of surface	Attrition	X-section	Function	Size

Ceramic Analysis Form

Site:_____ AU#: _____ Analyst:_____ Date:_____
Page__ of __

Cat .#	Prov.	Type	Color	Finish	Hardness	Form	Rim Dia.	# of Sherds	Weight	Comments

Faunal Analysis Form

Site:_____ AU#: _____ Analyst:_____ Date:_____
Page__ of __

Cat #	Prov.	Taxon	Element	Side	Portion	Sex	Age	C-Forms	N-Forms	Comment