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Laser scanning of the architecture and a cliff alcove at the Sunny Alcove site.  
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## **PUEBLO COMMUNITY IN THE LOWER SAND CANYON LOCALITY, COLORADO: PRELIMINARY REPORT OF THE SAND CANYON-CASTLE ROCK COMMUNITY ARCHAEOLOGICAL PROJECT, 2011-2014**

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### **Abstract**

The first phase of the Sand Canyon-Castle Rock Community Archaeological Project was conducted between 2011 and 2014 in several canyons of the southwestern Colorado, USA. The project involves detailed research into the settlement model of site clusters with well-preserved stone architecture that were inhabited during the final stage of the occupation of the area by the Pueblo culture in the thirteenth century A.D. Additionally, many examples of rock art and murals on the stone walls were recorded and analysed.

The thirteenth century A.D. was a time of peak population in the region and, near the end of that century, of emigrations from the area and ultimate depopulation. This period was also a time of many significant changes that can be observed in the settlement structure, site layouts, new types of architecture and material culture; this was also present at the sites examined within the project.

The sites investigated in the paper probably formed a cluster or community of allied sites that functioned in the thirteenth century A.D. This community was a part of a larger settlement system consisting of community centres, sometimes called towns, that were surrounded by dispersed small villages. There were more than sixty such communities in the central Mesa Verde region in the thirteenth century A.D.

**Keywords:** Mesa Verde, settlement structure, Pueblo architecture, defensive architecture, landscape archaeology

### **Resumen**

La primera fase del Proyecto Arqueológico Sand Canyon-Castle Rock Community se desarrolló entre 2011 y 2014 en una serie de cañones del suroeste de Colorado, en Estados Unidos. El Proyecto comprende investigación detallada de los asentamientos tipo cluster identificados en los sitios con arquitectura de piedra bien conservada que fueron habitados durante la etapa final de la ocupación del área por la cultura de los indios Pueblo en el siglo XIII. Asimismo, se registraron y analizaron numerosos ejemplos del arte rupestre y pinturas murales sobre paredes de piedra. El siglo XIII fue la época primero del máximo desarrollo de la población en ese área, y luego, hacia finales de dicha centuria, de la despoblación definitiva y abandono de la región. El período en cuestión fue también el momento de varios cambios significativos que pueden observarse en la estructura de los asentamientos, el diseño urbano, nuevos tipos de arquitectura y cultura material presentes en los sitios estudiados en el marco del Proyecto.

Los sitios estudiados en el artículo formaban probablemente un cluster o una comunidad de lugares aliados que funcionaba en el siglo XIII. Dicha comunidad fue parte de un sistema de asentamientos más grande que consistía en centros urbanos,

a veces llamados ciudades, que estaban rodeados de pequeños poblados dispersos. En el siglo XIII en la zona central de la región de Mesa Verde hubo más de sesenta comunidades de este tipo.

**Palabras clave:** Mesa Verde, estructura de asentamientos, arquitectura de los indios Pueblo, arquitectura defensiva, arqueología del paisaje

## INTRODUCTION

The first phase of the Sand Canyon-Castle Rock Community Archaeological Project was conducted between 2011 and 2014 during four field seasons in the Mesa Verde region, Colorado with a subsequent analysis of the data conducted in Colorado and at the Jagiellonian University in Krakow, Poland. The project focuses on the analysis and reconstruction of the settlement structure and socio-cultural changes that took place in Pueblo culture societies during the thirteenth century A.D. (ca. 1225-1280 A.D. — the so-called Late Pueblo III period). The research also focuses on analyzing the factors that affected Pueblo culture societies living in the area of the project's research and, as a consequence, led to migration and the depopulation of the entire region during the thirteenth century A.D.<sup>1</sup>

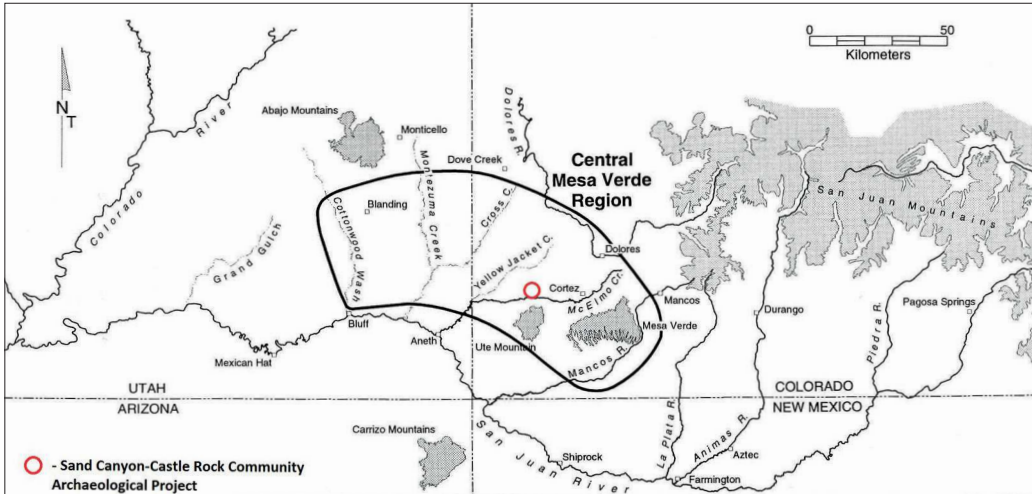
The research project is conducted mainly in three canyons in the area: Sand Canyon, East Rock Creek Canyon, and Graveyard Canyon (Figures 1, 2), located in the so-called Lower Sand Canyon locality in the Montezuma County, southwestern Colorado. These canyons contain the remains of around forty small sites (settlements and limited activity sites) and one large site or community center — Castle Rock Pueblo, which probably functioned as a community for the allied sites and were all dated to the thirteenth century A.D. (e.g., Ortman 2008; Palonka 2011, 2013a; Varien 1999). All of the sites investigated by the project are part of the Canyons of the Ancients National Monument (CANM) managed by the U.S. Bureau of Land Management, U.S. Department of the Interior.

## SETTLEMENT AND SOCIAL STRUCTURE IN THE MESA VERDE REGION

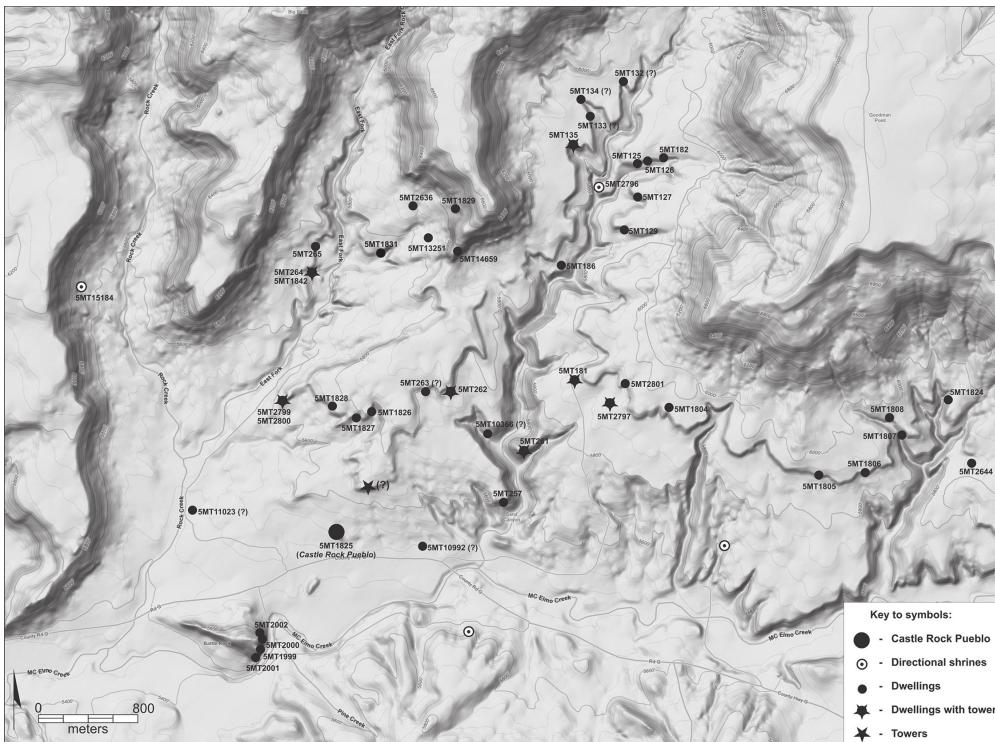
Pueblo societies in the Mesa Verde region in the thirteenth century A.D. were faced with many environmental, demographic, social changes, to name but a few. At the same time, the locations of their settlements shifted from the mesa tops and uplands to canyon rims, cliff alcoves, overhangs (e.g., Varien 1999; Varien et al. 1996), and near water sources (Lipe 2011: 265-267). There was also a change in the settlement pattern and aggregation — the settlements became larger, sometimes from fifty to seven hundred rooms (Lipe 2002; Lipe et al. 1999: 303; Varien et al. 1996: 100-101); they became more populated, and some were well-planned. Furthermore, many types of public and defensive architecture — including plazas, great kivas, D-shaped buildings, towers, and massive stone walls that partly or fully enclosed villages — were constructed during this period (e.g., Kuckelman 2002, Lipe et al. 1999; Palonka 2009, 2011; Varien et al. 1996; Varien 1999).

During the thirteenth century A.D. many types of defensive architecture — including circular, rectangular, or D-shaped towers, underground tunnels connecting two or more structures in a settlement,

<sup>1</sup> Project was conducted by the Institute of Archaeology at the Jagiellonian University in Krakow. The project's Principal Investigator is Dr. Radosław Palonka, Department of New World Archaeology, Institute of Archaeology, Jagiellonian University in Krakow, Poland. The permit Administrator is Dr. Mark D. Varien, Executive Vice President, Crow Canyon Archaeological Center, Colorado. Partners and co-sponsors of the Project were the following institutions: Faculty of History and Institute of Archaeology, Jagiellonian University in Krakow, Poland, US Consulate General in Krakow, Bureau of Land Management, CO, and Crow Canyon Archaeological Center, CO. Since the end of 2014 the Project is founded mainly by the National Science Centre in Poland.



**Figure 1.** The location of the central Mesa Verde region and the project research area in the North American Southwest (after Varien 2000: 8).

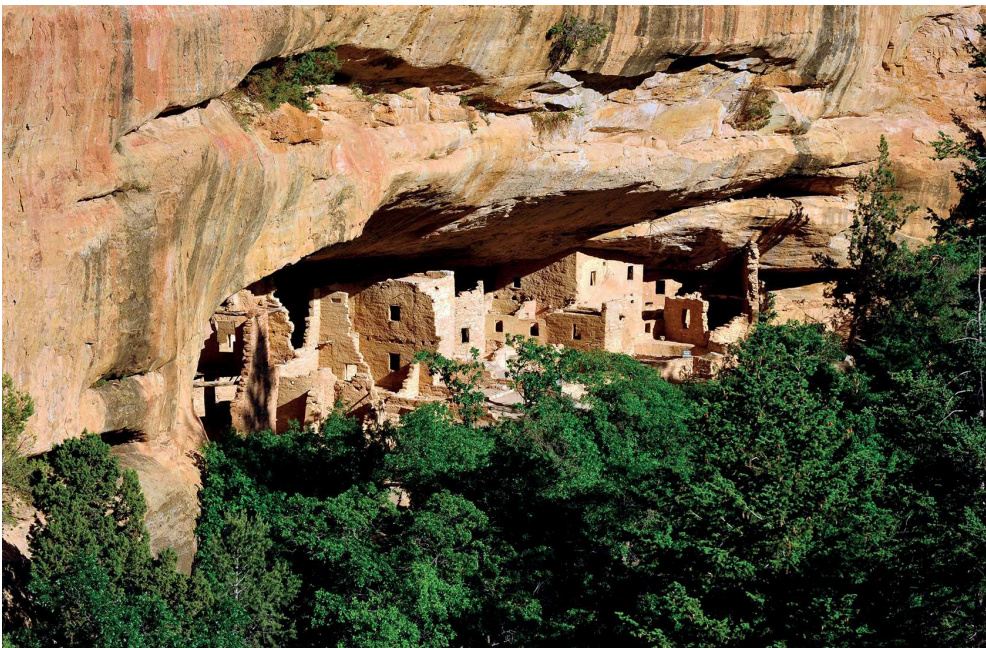


**Figure 2.** Location of sites in Castle Rock Pueblo community dating to the thirteenth century A.D. (sites with question mark are with not certain chronology).

loopholes in towers or in enclosing or protecting walls, and massive stone walls that partly or fully enclosed villages — were constructed in the Mesa Verde region (Kenzle 1993, 1997; Kuckelman 2006; Lipe and Varien 1999a, 1999b; Palonka 2009, 2011; Thompson et al. 1997; Varien et al. 1996).

The settlement pattern or model that existed during the thirteenth century A.D. in the central Mesa Verde region included communities or clusters of habitations consisting of a community center and about 15-40 small settlements near the community center (Varien 1999). A community center in the central Mesa Verde region was a settlement with more than 50 structures or 9 or more households in total that included rooms for living and storage, kivas, and other buildings, including public architecture (Lipe 2002: 211; Varien et al. 1996: 86). About 60 (or little more) community centers existed in the central Mesa Verde region in the late Pueblo III period (Lipe 2002; Lipe and Varien 1999b: 303-310; Varien 1999) that were the longest occupied sites in the region and served as centers for social, political, religious, and economic activities for smaller sites (Figures 3, 4).

I use the term “community” to refer to a “social organization that defines access to necessary natural resources, provides a level of social identity for its constituent households, and serves as a significant decision-making entity above the level of the primary household unit” that can play “several roles, including the definition of both land use territories and associated resource access rights for local populations within the broader regional system” (Varien et al. 1996:100; see also Adler 2002; Varien 1999:19-23; Varien and Ortman 2005). From a neo-evolutionary point of view, the community may be perceived as an “important social element in formative agricultural societies, particularly in terms of suprafamily economic and social integration” where integration is perceived “as important for reasons that include defense, risk aversion, capital investment in technology, and trade” (Kolb and Snead 1997:610, after Johnson and Earle 1984:131).



**Figure 3.** Spruce Tree House, one of the biggest cliff dwellings dated to the 13<sup>th</sup> century A.D. from Mesa Verde National Park, Colorado. Photo by R. Słaboński.



**Figure 4.** Part of the Long House, cliff dwelling dated to the thirteenth century A.D., with ladders for communication between lower and upper levels. Mesa Verde National Park, Colorado. Photo by R. Palonka.

The economy of the Pueblo people was based on farming, dominated by growing maize as well as squash and later beans (Cordell 1997; Matson 1991; Plog 1997). During later time periods (from ca. Pueblo I period-700/750 A.D.), cotton was also cultivated (Cordell 1997).

Population estimates vary for the central Mesa Verde region during the thirteenth century A.D. The greatest estimated number of people inhabiting the area at that time is about 30,000-45,000, and they would have lived in community centers and small sites near the large sites (e.g., Glowacki 2006); however, other estimates propose that the number of people living in the area was 10,000 to 15,000 people (Lipe 2002:213-217; Varien et al. 2007:280-289; Wilshusen 2002). The peak in population might have occurred around the mid-1200s (Glowacki 2006:144; Lipe and Varien 1999b) and was at least partly caused by an influx of Puebloan populations coming from the western part of the region and perhaps from the north as well.

As a consequence of the increasing conflicts that occurred between different Pueblo groups (or with non-Pueblo), environmental and climatic perturbations, competition for reduced resources or water supplies or any other cause, the entire Mesa Verde region witnessed its final stage of Puebloan occupation at the end of the thirteenth century A.D. The final depopulation and migration occurred in stages during the late 1270s and early 1280s A.D. (Kohler et al. 2011; Lipe 1995; Lipe and Varien 1999). The micro-and macro-level study conducted during the project in the Sand Canyon Locality can provide important information about Pueblo societies living in these three canyons investigated the project and the entire central Mesa Verde region during this final stage of the Puebloan occupation of the area and shed new light on the reasons for the migration.



## METHODOLOGY OF RESEARCH

During the first phase of the project (2011-2014) twenty-four out of around forty of the small Pueblo culture sites either partly or fully located in the project research area were surveyed and investigated using non-invasive techniques. Also, part of Site 5MT1825 (Castle Rock Pueblo) — the community center — was also documented, focusing especially on the rock art preserved at the site. Great emphasis was also put on modern techniques of documentation including photogrammetry and 3D documentation of selected sites using a laser scanner. Geophysics research including mainly electrical resistivity, GPR and magnetometer studies were also conducted at several sites. The field seasons were conducted in April, May and June of every project year, because of the weather conditions and the possibility of having much wetter soils during the spring than other times of the year in order to obtain more precise images of electrical resistivity surveys.

### Datums

One of the most important activities of the project research in 2014 was setting up new solid datum points for at least 14 sites. Those sites did not have datums or they had been destroyed by natural conditions or vandals and there was a need to set up new datums, both for the project research for the coming seasons and other research in the future. Datums were set up with the help of Gerald Huddleston, Huddleston Land Surveying in Cortez, Colorado. The datums were established at the sites in all three examined canyons, but mostly in Sand Canyon (Figure 5).



**Figure 5.** Archaeological and geodetics field survey conducted in east side of Sand Canyon. Three sites may be seen in the alcoves in the background. Photo by R. Słaboński.

## Mapping and documenting of the architecture

One of the aims of the project is to produce accurate and detailed maps and plans of the sites with site boundaries, maps of the cliff alcoves with location of different levels within the alcoves and the topography of the surrounding terrains. Plans of the sites were prepared using the Electronic Tachimeter Topcon GPT 3007N and Leica TC407 and AutoCAD software and the elevation above sea level for particular sites was established on the basis of a GPS survey and known datums from previous surveys or new datums set by the project works.

The documentation of the standing architecture in all the examined sites included a 1:20 scale drawing on millimeter paper for the interior and exterior walls of all of the architecture visible on the modern ground surface and accessible for such documentation. The digital documentation included photography, photogrammetry, and laser or 3D scanning (laser scanning was especially important in parts of the sites that are not accessible for traditional drawings, for example being located in places with limited accessibility). The photographs were taken with different digital cameras for all the surface architecture for all sites investigated during the four seasons; the photographs were taken with metric rod and scale for all the walls and rooms. Furthermore, panoramas of entire sites were also made. Additionally, a special type of photography — photogrammetry — was used for four sites thus far.

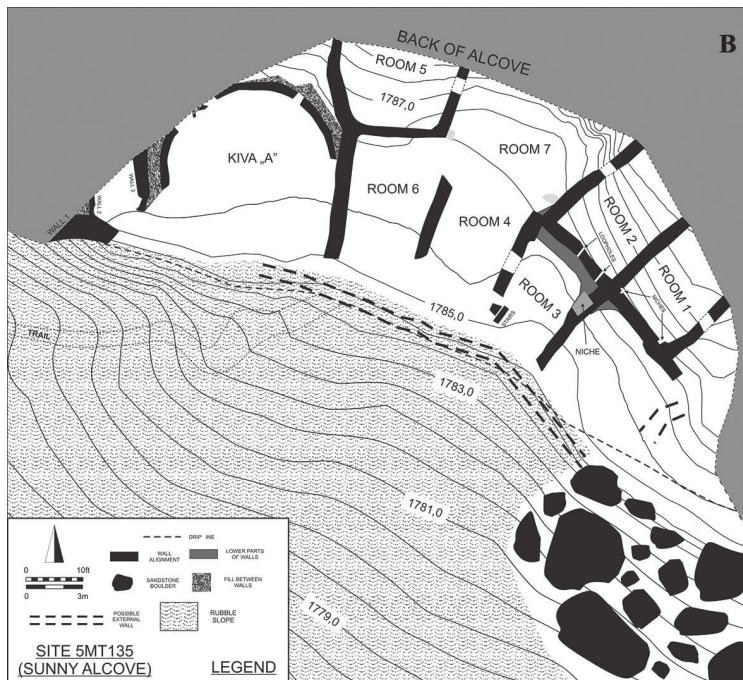
Additionally to these methods of documentation, six sites were scanned by the ArcheoExplorers company; the equipment for this kind of documentation included Scanner FARO Focus 3D S120 (Figures 6a, 6b, 7). Data from three of scanned sites has already been analyzed and the results have been gathered; the other three are waiting for data processing and analysis. The scanning allowed us to obtain 3D pictures of the scanned sites as well as the profiles of all the visible and standing architecture, views and plans of the sites. This type of documentation is especially important for the architecture that is located in places that are difficult to access for hand drawing.

## Geophysics research

The geophysics research (mainly electrical resistivity) was conducted in thirteen sites in the Lower Sand Canyon locality. The research was conducted both on the canyon slopes below the alcoves containing architecture and in a few examples on the flat, open areas (for example, in open sites 5MT181–Mad Dog Tower and 5MT2797). Electrical resistivity was conducted using Electrical ADA-5MP Instrument (ADA-5R ELMES). The data was processed using Golden Software Surfer. Prospection was carried out to 1-1.2 m below the modern ground surface and the sampling interval was 1x1 m and in some cases 0.5x0.5 m. In one of the sites, located in Sandstone Canyon, GPR research (with the equipment MALA Pro EX with 500 MHz antenna) was also conducted.

## Analyzing the artefacts in the museum

During the season of 2014 parallel work was also conducted focusing on the documentation and analysis of artefacts that included pottery sherds from the sites in the Lower Sand Canyon locality that were collected during the initial surveys conducted in the 1970s and 80s by American scholars. The collection of pottery, lithic and stone materials as well as organic materials from Sand Canyon locality is kept in the Anasazi Heritage Centre, Bureau of Land Management, Dolores, Colorado. Two of the students from our project team are currently writing their M.A. theses on the basis of research on this collection.



**Figure 6.** a) Laser scanning of the Site 5MT135 (Sunny Alcove), cliff dwelling located on west side of Sand Canyon. Part of the site is located on the slope below the alcove. Photo by J. Nawrot; b) Plan of the Sunny Alcove site showing the structures in the alcove. Drawing by A. Danecki and P. Szczepanik.



**Figure 7.** Laser scanning of the Site 5MT13446, the tower that is located approximately 120 m SE of the Sunny Alcove site. Photo by J. Nawrot.

### **LOWER SAND CANYON LOCALITY – SUMMARY AND RESULTS OF RESEARCH FROM 2011 to 2014**

The sites in the Lower Sand Canyon locality are divided geographically into several groups that include sites located mainly in three canyons, Sand Canyon, East Rock Creek Canyon, and Graveyard Canyon (see Figure 2). These sites during the thirteenth century A.D. might have created a community of allied sites, and the term “Castle Rock Community” (Ortman 2008, Palonka 2010, 2011) refers to Castle Rock Pueblo, the community center and the small sites in the Lower Sand Canyon area that were probably connected by different types of ties with the community center.

The elevation of the area ranges between approximately 1650-2100 m above sea level in the northern part of the area (Adler and Metcalf 1992: 52-53; Gleichman and Gleichman 1992:58-62; Ortman 2008: 127) and most of the sites are located between 1650-1800 m. During the Puebloan occupation of the Lower Sand Canyon area in the thirteenth century, the McElmo floodplain was probably a good place to farm. Other areas near particular sites also had good farming potential, especially those on uplands or other areas of adequate rainfall in the higher part of the Lower Sand Canyon area. The requirements for successful farming in the area are primarily a minimum of 120 frost-free days and about 14 inches (35 cm) of precipitation per year.

The most plentiful water source in the Castle Rock Community was probably the McElmo Creek, although it is not certain if it was a permanent water source (also it would have been too alkaline to provide good drinking water — personal communication with Mark Varien, 2009), and it flowed

primarily during the spring runoff and summer flash-flood (and probably it was filled with water or snow during the fall or winter). Most of the habitation sites dating from the late Pueblo III period were located near seeps or springs rather than near the McElmo Creek (Gleichman and Gleichman 1989: 65). The distance to the water sources varied at those sites: water is available within the boundary of most sites or very close to them, and in several cases it is in a distance of several hundred meters from the sites. Two dams and associated reservoirs were recorded at Castle Rock Pueblo (Kuckelman 2000). In the Castle Rock Community, dams are present at sites 5MT125, 5MT182, and 5MT1807. Site 5MT2001 is a small site within the Castle Rock Community where a reservoir is also present. Although other sites in the area might also contain such features; however, the available data are insufficient to confirm this.

The precise boundary of the Castle Rock community is difficult to establish. In our analysis of the sites from the Lower Sand Canyon area, we estimate the approximate area of the community on the basis of Varien's estimates of the size of community catchments in the Mesa Verde region as four to five kilometer in radius from the community center (Varien 1999) and the boundary of the Castle Rock community follows Ortman's (2008) proposal of the boundary as marked by four shrines. The shrines (stone circles approximately 5 to 10 m in diameter) are located roughly to the north, west, east, and south of Castle Rock Pueblo. Each of the shrines is situated "in a significant location, one that relates Castle Rock to the cardinal directions, the surrounding landscape, and prominent topographic features on the horizon" (Ortman 2008:134). These shrines may be considered as community boundary markers having ritual and spiritual functions; this is known from the ethnographic records of historic Pueblo societies such as the Hopi, Zuni, Keres, and Tewa (e.g., Ortiz 1969:19-20; Ortman 2008:138-146).

The sites fully or partly documented and investigated during the 2011-2014 seasons include:

- **Sites located in Sand Canyon:** 5MT125, 5MT126, 5MT127, 5MT129, 5MT135 (Sunny Alcove), 5MT181 (Mad Dog Tower), 5MT182, 5MT183, 5MT185, 5MT186, 5MT261, 5MT262 (Saddlehorn Pueblo), 5MT263, 5MT13446, 5MT2796, and 5MT2797;

- **Sites located in East Fork of Rock Creek Canyon:** 5MT264 (The Gallery/Serpents Quarter Pueblo), 5MT265, 5MT1831 (Fortified House), 5MT1826, 5MT1827, 5MT1828, 5MT1842, and 5MT1843.

On the basis of the pottery types and the architectural styles, the examined sites from this canyon has been dated to the Pueblo III period, and it is probable that they were occupied during the late Pueblo III period, in the thirteenth century A.D. The majority of the pottery we recorded is Mesa Verde Black-on-white and McElmo Black-on-white pottery from the Late Pueblo III period; however, there are also some earlier types of pottery (Figure 8). The McElmo architectural style, typical also for this period dominated also at these sites. Only a few small wood beams are preserved at the sites (e.g., at sites 5MT135, 5MT264, and 5MT1831). In 2014 there was an initial survey and inventory of the wood possible for the tree-ring dating that is planned for the next season of the project work.

### East Fork of Rock Creek Canyon

Eight sites in this canyon were surveyed and documented fully or partly during the project works in the seasons 2011-2014. All of these sites besides one — Site 5MT1842 — are cliff dwellings with signs of multiple habitation; however it is clearly visible that large parts of the sites were also located on flat areas and/or talus slopes below the alcoves. The farming fields that might have been used by the Puebloans who inhabited those sites were probably located very close to the sites where the topography allowed for this (for example at sites 5MT264, 5MT265, 5MT1831) and/or on the mesa tops above the alcoves and niches where the sites were located. The nearest water sources such as springs and seeps were probably present near the alcoves; the nearest drainage is in Rock Creek Canyon — the McElmo Creek that might have been the permanent water source at that time — is south at a distance of 1-2.5 km from the sites (Palonka 2009, 2011).

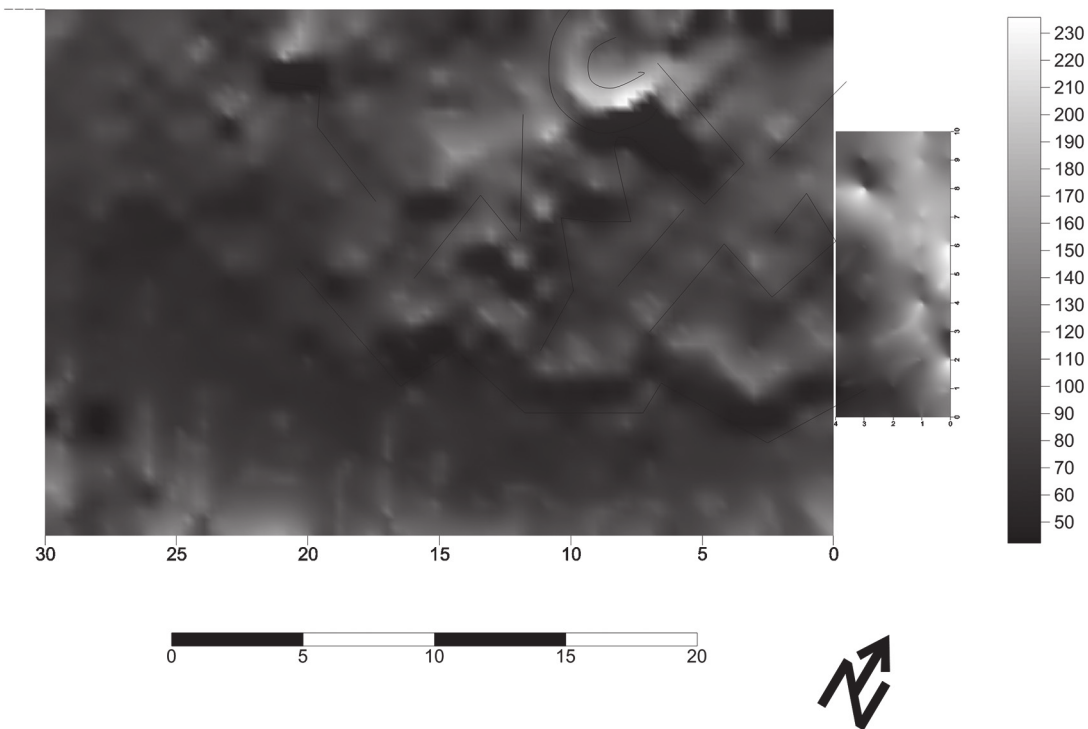


**Figure 8.** Typical thirteenth century A.D. pottery from the Mesa Verde region and Sand Canyon area. Photo by R. Palonka.

There were at least three to five towers at the sites located in East Rock Creek Canyon: at site 5MT1831 (one or two towers), at site 5MT1842, and at sites 5MT2799/5MT2800 (one or two possible towers or related lookout structures). At the Fortified House (Site 5MT1831) there were probably two towers; one was located in a very high and inaccessible place attached to the cliff face and several meters to the east of the main part of the site, the alcove (facing directly south, in a manner that

allows visual communication with several other sites in the canyon, for example with the tower at site 5MT1842) and the other tower was located below the main part of the site on a relatively flat area. The alcove itself with a 10-meters long wall with eleven loopholes (probably for observing the surrounding area) and with only one entrance could have served as a refuge for the inhabitants living in the structures, like the kiva and rooms located below the alcove and close to one of the towers. Site 5MT1842 is the tower located on the knoll or pinnacle with some associated structures below the pinnacle and, as noted by the project team, this location allows visual communication between the above-mentioned sites and several more sites including sites 5MT2636, 5MT1829, 5MT13251, and 5MT14659. In this cluster, two towers were probably crucial for the visual or communication system: 5MT1842 and 5MT2799/5MT2800, and these two were also in visual contact.

The electrical resistivity survey undertaken at sites 5MT264 and 5MT265 (Figure 9) in 2012 and again in 2013 revealed that apart from the architecture in the cliff alcoves, at least the same or a similar number of buildings were also located outside the alcoves, on the canyon slopes or flat areas just below the alcoves. In some cases, like for example at site 5MT265 (and Fortified House-Site 5MT1831 described above) the inhabitants could have lived in the kiva and associated structures below the alcove and the buildings inside the alcove might have served as storage rooms and places of refuge in times of attack. The wall that stretches along the entire niche with only one opening/entrance probably provided very good protection from entering inside (Figure 10). Another possible refugee in East Rock Creek Canyon would have been Site 5MT1826. The main part of the site is located within the alcove,

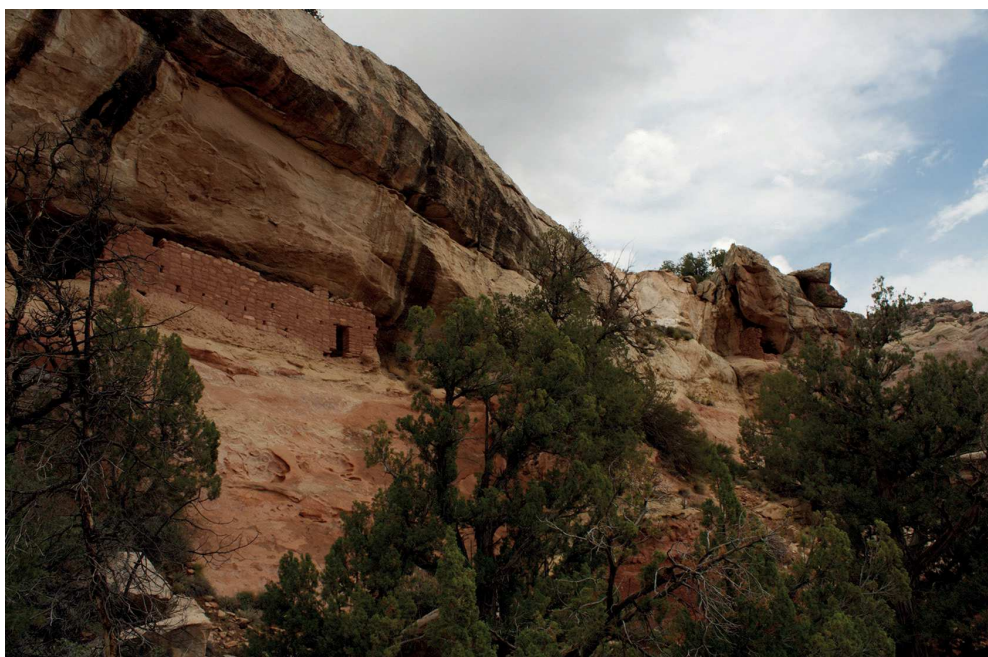


**Figure 9.** Geophysics results from the research in the Site 265 in East Fork of Rock Creek Canyon. Drawing by P. Szczepanik.

but there is not much evidence of permanent habitation there besides the massive wall that goes across the entire length of the alcove. The wall has only one opening or entrance leading inside the alcove; there are also several loopholes in different levels of the wall. This is probably because some more structures were located below the alcove, although this is difficult to establish precisely because most of the area is now covered by rock boulders fallen from the cliff wall. This proposed refugee could have been also used by people living in nearby sites 5MT1827 and 5MT1828.

Most of the images received from the geophysics research at sites 5MT264 and 5MT265 overlap parts of the walls visible on the modern ground surface. Also, in both cases, the relatively large kivas — the underground structures for household-ritual activities — were probably situated on the slopes and flat areas below the cliff alcoves. Based on the geophysics research results, there are also some traces of other buildings associated with the kiva and supporting walls in these sites. These two sites were probably multiple-habitation sites and they are located within 3-4 minutes walking distance. Between them there is also one small site, 5MT1843, probably also dated to the Pueblo III period, where we found many artefacts such as parts of or whole *manos* and *metates* for grinding corn and many lithic (stone and flakes) materials and pottery assemblages. The function of this site was probably not habitation; it was most likely used for the preparation of food and maybe the production of tools. In this site there are also some petroglyphs (mostly holes drilled in the cliff face in the form of lines or zigzags); they are located mostly in the northern part of the site.

The rock art documented and partly discovered by our project in 2012 and 2013 at site 5MT264 (The Gallery) in East Rock Creek Canyon includes mostly human figures with triangular bodies painted in red and white (Figure 11). The anthropomorphic figures like these have analogies in similar motifs in rock art in Utah and Colorado during the Basketmaker II and III periods



**Figure 10.** Part of the Site 5MT1831 (Fortified House), probably refugee, located in the alcove with loopholes for observing the area outside the alcove. Photo by A. Kucia.

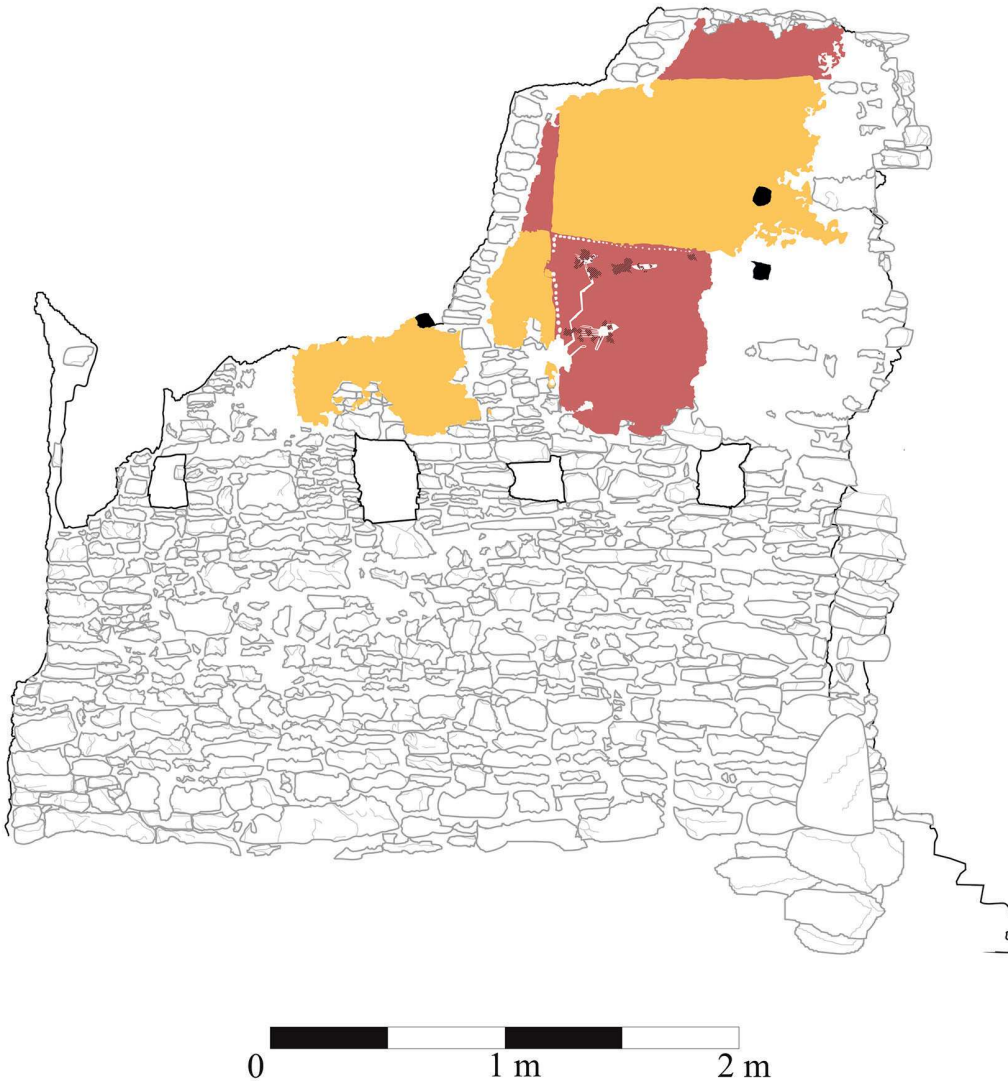




**Figure 11.** Rock art (on the left) at The Gallery in the context of the preserved architecture and murals of one of the buildings at the site. Photo by R. Słaboński.

(ca. 500 B.C.-700 A.D.) (e.g., Cole 2009; Schaafsma 1980, Schaafsma 1994) and are dated much earlier than the thirteenth century A.D. — the main occupation of The Gallery site. Two figures, one painted in red and the second in white have their hands lowered along their sides while the third one (painted in white) is with raised hands and possibly a crown-like head-dress, quite rare in southwestern rock art. However, there are also some analogies in Utah, as well as the northern part of Arizona and New Mexico of similar motifs. This style might be interpreted as Fremont or eastern variants of San Juan Basketmaker anthropomorphic-style rock art (Cole 2009: 117-143, Figures 98b, 109g; Rozwadowski 2009: 228; Schaafsma 1980: Map 3, 73, 109-121, 1994: 45-49; Slifer 2000: 26-34). To the left of the anthropomorphic figures there are some remnants of a few other depictions painted in red, one of them being a bird, probably a turkey or parrot.

Apart from the rock art there are some murals on the walls of Room B at the Gallery site (Figure 12) depicting mainly geometric symbols, like dots painted in white on brown plaster (48 dots are still visible, and there probably were more than fifty in total), a white zigzag line (most likely the symbolically represented serpent, a symbol indicating the fertility of the land and the underground world), and three birds, probably turkeys, which were raised at this time by the Pueblo society and in the thirteenth century A.D. were the main sources of protein for Pueblo societies (Van West and Dean 2000). All of the plaster seems to have been situated on the second story of the building from the floor to the ceiling of the room on this level. There are also numerous later engravings including initials, names and other modern specimens of vandalism left on the plaster and mural by people in the 19th and 20th centuries, often referred to in American archaeological terminology as *modern graffiti*.



**Figure 12.** Mural in Room B at the Site 5MT264 (The Gallery) in the context of the preserved part of the architecture. Drawing by A. Kucia and J. Nawrot.

### Sand Canyon

This is the main canyon in the project research area, running roughly north-south, with a total length of around 11 kilometers. Only around half of it (ca. 5 km north of the McElmo River Valley) is considered as part of the Castle Rock community. The Ancient Puebloan settlements were situated on both sides of the canyon and also in spurs running east and west from the canyon. Seventeen sites dated to the Pueblo III period (1150-1300 A.D.) were documented and surveyed during the four seasons of the project work undertaken there.

Most of these sites (thirteen) are cliff dwellings with signs of single or multiple habitation. One site, the community center, Castle Rock Pueblo (Site 5MT1825) is situated on the top and around the base of a 20 m tall butte; three other sites are situated on a relatively flat area (5MT181, 5MT 2796, and 5MT2797). Two of them (5MT181 and 5MT2797) were towers with a few associated structures and one site (5MT2796) was probably a shrine. In the cliff alcove sites it is clearly visible that large parts of the sites were also located on the flat areas and/or talus slopes below the alcoves similarly to the sites in East Fork of Rock Creek Canyon. We also identified at least one potential area that could have been a farming field; the area is located near the Sunny Alcove site (5MT135). It is a rectangular area marked by lines of rocks and attached to the cliff face from one side.

Castle Rock Pueblo (Figure 13) consists of more than 60 structures, including a minimum of 40 rooms, 16 kivas, nine towers, a D-shaped building, several sections of village-enclosing wall, at least two plazas, and several midden areas (Crow Canyon Archaeological Center 2000; Kuckelman 2000). The village was probably founded in the 1250s A.D., as indicated by tree-ring dates. The latest tree-ring date from the site is 1274 A.D. (Kuckelman 2000), and after this date the occupation of the site ended. Excavations conducted in the 1990s by Crow Canyon Archaeological Center revealed that the settlement was attacked as indicated by human remains representing at least 41 unburied individuals, some showing signs of violent death, as well as burned structures. These data correspond with the oral tradition of the Hopi people that was recorded in the 1870s about an ancient battle that could have taken place at Castle Rock (Kuckelman 2002; Lightfoot and Kuckelman 2001).

In the lower part of Sand Canyon there were at least four more towers besides the nine towers in Castle Rock Pueblo (Figure 14, see also Figure 7). There are two or more potential groups of sites or



**Figure 13.** Castle Rock Pueblo (Site 5MT1825) is located differently than most of community centers, on the top, and around the base of a butte. In the photo there are remnants of one of the towers at the site. Photo by R. Palonka.

clusters of sites within the community consisting of four or more sites that were near to each other or within visual contact. The first proposed group might have been formed by sites located in the central part of Sand Canyon: 5MT135 (Sunny Alcove) with an isolated tower (Site 5MT13446) on the western side of the canyon and the sites on the eastern side: 5MT125, 5MT126, 5MT182, 5MT183, including the shrine (Site 5MT2796). A second group consists of sites: 5MT181 (Mad Dog Tower), 5MT1804, 5MT2797, 5MT2801 located on the eastern side of Sand Canyon and sites 5MT262 (Saddlehorn Hamlet) and 5MT263 located on its western side (Figure 15). It is important to note that the tower at the Mad Dog Tower site and the isolated tower (Site 5MT13446), located close to Sunny Alcove from the proposed second group of sites, were probably also in visual contact, and — even more importantly — this indicated visual contact between two different clusters of sites in the community. This should be verified through further studies and probably some sort of experiment to test the possibility of the intervisibility between the two sets of sites.

Most of the small sites from Sand Canyon documented by the project are dated to the thirteenth century A.D. (Late Pueblo III period), however in some sites there are pottery and stone architecture that suggest earlier occupation of the sites, probably during the early Pueblo III period or even Pueblo II (900-1150 A.D.). This situation probably took place at sites 5MT185 and 5MT263. Also in the Vision House site (Site 5MT127) (Figure 16) the architecture and pottery indicate the Late Pueblo III occupation, although above the biggest structure in the alcove, on the niche ceiling there is a petroglyph that should be dated much earlier, probably to the third-fifth century A.D., similarly to the anthropomorphic figures in The Gallery site. In the petroglyph there is depiction of a trapezoid anthropomorphic figure, approximately 60-70 cm height.



**Figure 14.** Site 5MT181 (Mad Dog Tower) located in Sand Canyon. In the background there is the highest point of the area: Sleeping Ute Mountain, 3000 meters above sea level, located approximately 3-4 kilometers from the Castle Rock Community. Photo by R. Słaboński.

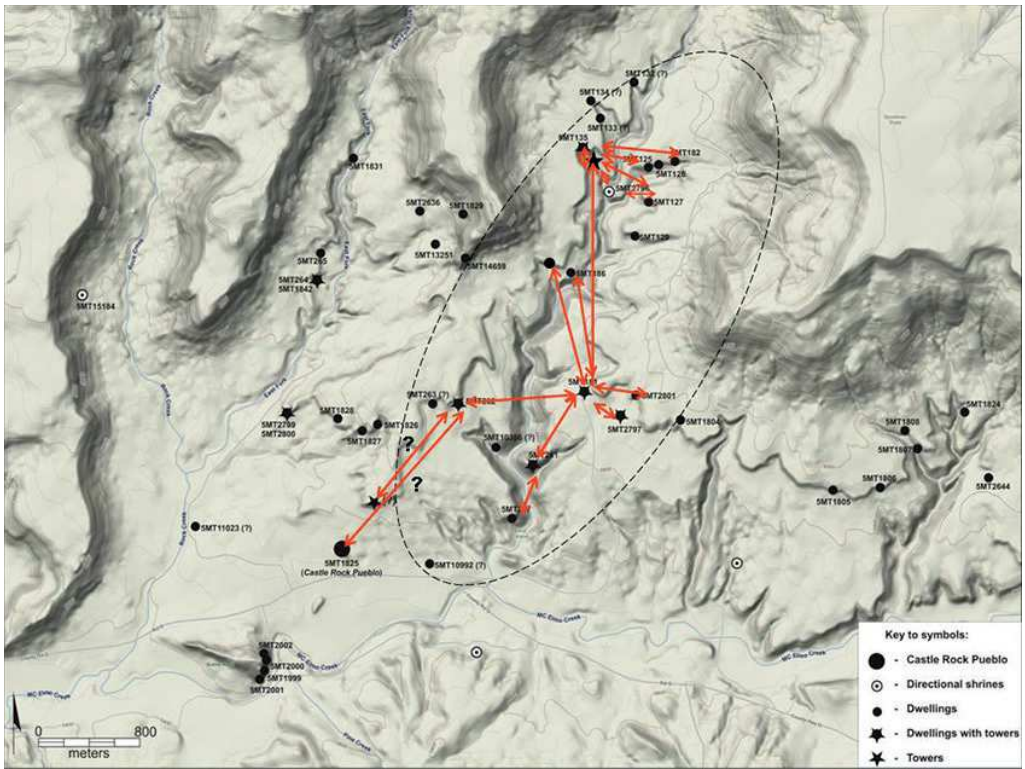


Figure 15. Map showing possible visual contact between the dwelling sites and towers in Sand Canyon.

Rock art was recorded around several sites in Sand Canyon. The most known petroglyph panel from the research area is located in Castle Rock Pueblo in Sand Canyon. This is a rock art panel on the north face of the butte where the site is situated and depicts three people with rectangular or globular bodies fighting with bows and arrows (Kuckelman 2000; Palonka 2010: 126-127, Figs. 8-9). In some other sites (e.g., Site 5MT129 and some other sites) we noticed and documented more examples of ancient Pueblo petroglyphs, like spirals, zigzag lines, bird (probably turkeys) tracks, lines and some abstract motifs, difficult to interpret at this stage. At the Site 5MT129 (Figure 17) there is a panel with petroglyphs that is situated on the cliff face directly facing south, just west of the alcove where the part of the site was located. There are engraved spirals, rectangular shapes connected by a line, lines and relatively deep incisions that may be interpreted as places for sharpening the tools for making the petroglyphs; such a possible explanation was proposed by our team member and is also known from the interpretation of different sites with rock art (e.g., Cole 2009: 4). The function or meaning of some motifs might be interpreted on the basis of historical and modern Pueblo Indian oral tradition; for example, spirals are often interpreted as symbols of wind or marking a place with water or even represent migration or journeys (e.g., Cole 2009: 192-193; Patterson 1992: 185-186). The lower part of the panel at this site is already completely destroyed probably both by atmospheric and modern human activity (vandalism). Modern graffiti is also present in several cliff dwellings in Sand Canyon, for example in Sunny Alcove (Site 5MT135).



**Figure 16.** Part of the Site 5MT127 (Vision House), site located on the east side of Sand Canyon. Photo by R. Palonka.



**Figure 17.** Petroglyph panel at the Site 5MT129 documented in 2013 by Sand Canyon-Castle Rock Community Archaeological Project. Photo by R. Palonka.

## CONCLUSIONS

The Sand Canyon-Castle Rock Community Archaeological Project focuses on the analysis and reconstruction of the settlement structure and socio-cultural changes that took place in Pueblo culture during the thirteenth century A.D. in the central Mesa Verde region, southwestern Colorado. Pueblo societies in the Mesa Verde region in the thirteenth century A.D. were faced with many changes including those of an environmental, demographic, and social changes. At the same time, the locations of their settlements shifted from the mesa tops and uplands to canyon rims, cliff alcoves, and overhangs (e.g., Varien 1999; Varien et al. 1996). There was also a change in the settlement pattern, for example, aggregation — the settlements became larger, from fifty to seven hundred rooms (Lipe 2002); they became more populated, and some were well-planned. Additionally, many types of public and defensive architecture — including plazas, great kivas, D-shaped buildings, towers, and massive stone walls that partly or fully enclosed villages — were constructed in the Mesa Verde region.

The characteristic settlement pattern that existed during the thirteenth century A.D. in the area also included communities or clusters of habitations consisting of a community center and clusters of small settlements near the community center (Varien 1999). One of areas within the central Mesa Verde region where we can find examples of such a community is the Lower Sand Canyon locality. The sites in this area include one large site — Castle Rock Pueblo (Site 5MT1825), consisting of more than 60 structures including habitation and storage rooms as well as public architecture that might have functioned as a community center, and around 40 other small sites. All of these sites might have formed a community of allied sites, the so-called Castle Rock Pueblo Community. Small sites at the Castle Rock Pueblo Community consist of several rooms or buildings, and usually from 3-4 rooms to more than ten rooms (Fig. 4). The exact number of the rooms is difficult to establish because only part of the architecture has been preserved and is still visible on the surface, especially in the cliff alcoves.

The results of the geophysical research are very promising, for they show that the extent of settlements in the Castle Rock Pueblo community was not limited exclusively to the interiors of rock niches, but that a large part of the buildings was also located outside of them. Geophysical surveys help, for example, to answer questions about the demographics of particular sites and of the whole settlement group, and they already suggest a much greater density of settlement and population in the studied micro-region and beyond than previously thought. We are now trying to reconstruct the potential number of structures at every site under examination; this may shed more light on how many people lived at particular sites and on the potential demography of the entire Castle Rock Pueblo Community.

Rock art in the Castle Rock community is represented both by ancient petroglyphs and paintings. This mostly includes geometric designs (lines, zigzags, bird tracks, spirals, and meanders), fighting warriors, and anthropomorphic figures with triangular or trapezoidal bodies. Some of the rock art (anthropomorphic figures) is dated much earlier than the Late Pueblo III period of occupation of these sites — in the Basketmaker period (roughly 500 B.C.-700 A.D.). However, most geometric designs present at the examined sites, such as spirals, were also common in the Pueblo period and may be interpreted as associated with Late Pueblo III sites.

Buildings and features that might have functioned as defensive structures in villages in the central Mesa Verde region during the thirteenth century A.D., and particularly in the Lower Sand canyon area, mainly include towers, protecting walls, village-enclosing walls, underground tunnels, loopholes, and presumably other constructions such as D-shaped buildings and other tall structures. The data suggest that the small sites in cliff alcoves were situated more defensively than the large cliff dwellings described above, in that ladders were necessary in order to enter many of them. Hand-and-toe holds are associated with a few sites in the lower portion of the Sand Canyon locality. Walls extend the

entire length of the alcove and create only one entryway into at least six of the examined sites. At two cliff dwellings there is not much evidence of permanent habitation within the alcove, although there is evidence of structures below the shelters. These alcoves might have functioned as refuges for inhabitants living below the alcoves and also for people at other nearby small habitations.

At least eight sites in the proposed Castle Rock community contained one or more towers, or towers that were located in proximity to the sites. Some free-standing towers in the lower portion of the Sand Canyon locality are very close to the habitation sites; the distances range from several to 30 or 40 meters to as far as 100-350 meters. We consider all of these towers to have been associated with the nearest habitation. We propose that the primary function of these towers was communication, because most are intervisible with nearby sites, and that their secondary function was defense. Among the sites in the Castle Rock Community that I examined, six groups or clusters of sites within the community consist of four or more sites that were near each other or within visual contact.

The settlement organization of sites in the Castle Rock community that includes sites in locations difficult to access as well as intervisible may suggest a cluster of allied sites that was integrated into one closely cooperating community. This community might have been created, and might have functioned, as a response to a threat from neighbouring communities or from non-Pueblo invaders in an attempt to better defend the inhabitants of particular settlements and the entire community. Individual communities were probably independent and autonomous, although inter-community alliances might have been needed because of increasing conflicts (Lipe et al. 1999: 331-335). Conflicts could have erupted between Pueblo and non-Pueblo groups (Lipe et al. 1999: 340-341; Kuckelman 2002; Wilcox and Haas 1994). If, within the Mesa Verde region, conflicts occurred between different Pueblo groups (or with non-Pueblo), whether due to environmental and climatic perturbations, competition for reduced resources or water supplies, or for any other reason, these conflicts probably would have occurred between communities rather than within communities.

Ethnohistoric records contain information about confederacies and alliances among Pueblo groups (Upham et al. 1994; Wilcox 1991) that have been supported in some cases by archaeological data (LeBlanc 1999: 287, 318; Spielmann 1994; Minge 1976: 49-51). Such pacts or the creation of alliances might have provided better protection for villages and lands from both Pueblo and non-Pueblo intruders; alliances between pueblos might have become more common after the mid-1600s, when Athapascan raids and attacks became more frequent (LeBlanc 1999: 45). Also, archaeological data confirm that confederacies might have been developed in conjunction with aggregation and “increasingly intense warfare, evidenced by settlement location shift from lowland areas to defensible hilltops and the palisading villages” (Spielmann 1994: 51). Spielmann also points out that alliances among pueblos in one cluster may have developed in part for mutual defense, whereas confederacies “may have been equally important in suppressing hostilities within local areas.” Also, to defend against intruders, the ability to build alliances and take control of land is probably as important as, and in some cases even more important than, building defensive architecture and constructing sites in defensible locations (LeBlanc 1999: 287, 318; Spielmann 1994). Intervisibility between “sets” of sites and the absence of intervisibility with another “set” of sites within, for example, the Kayenta region (Haas and Creamer 1993) may be inferred as evidence for the presence or absence of political alliances respectively (Wilcox and Haas 1994: 217). There may have been a similar state of affairs at the Castle Rock Pueblo Community.



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