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Introduction

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The Crow Canyon Archaeological Center of Cortez, Colorado, is pursuing a continuing research program focused on the Anasazi occupation of the Sand Canyon locality in southwestern Colorado (Figures 1.1 and 1.2) during the Pueblo III period (A.D. 1150-1300). Project fieldwork began in 1983 and will continue through 1994. The fieldwork includes environmental studies, intensive and sample-based surface surveys, oral history, small-scale test excavations at a number of sites, and intensive excavations at portions of a few sites, including Sand Canyon Pueblo (5MT765) and the Green Lizard site (5MT3901). Sand Canyon Pueblo is the largest thirteenth-century settlement in the locality (see Bradley, this volume). This apparent single-component, walled site has approximately 420 surface rooms, 90 kivas, 14 towers, a D-shaped birable structure, and a great kiva.

The long-term research goals of the Sand Canyon Archaeological Project are (1) to define the community or communities that occupied the Sand Canyon locality during the period A.D. 1150-1300 and to characterize their sociocultural organization and sustaining environments; (2) to identify social, cultural, and environmental changes that took place in the Sand Canyon locality during the period A.D. 1150-1300, with a special focus on the abandonment of the locality in the late 1200s; and (3) to relate the locality’s patterns of organization and change to larger patterns in the Pueblo Southwest, as well as to theoretical frameworks that promote understanding and interpretation of both locality and area-wide configurations. The project also includes (4) instrumental studies, such as chronology building and analysis of assemblage-formation processes, that provide necessary foundations for the inferences required to address the three primary problem domains.

This monograph provides a progress report on research through the 1990 field season. It focuses on fieldwork results; the interpretations offered in this volume are generally limited to preliminary statements about specific subprojects (e.g., Sand Canyon Pueblo excavations, survey, testing program) and are often quite tentative. A number of comparative studies designed to address higher-order questions in the research domains are underway or are planned for the near future. A synthesis of project results addressing the problem domains and incorporating these studies is planned for 1995.

Annual reports have been prepared for all field operations and have been given limited circulation. In addition, a number of meeting papers, several journal articles, and several M.A. theses and Ph.D. dissertations have been produced so far during the Sand Canyon Archaeological Project. Many of these are cited in the “History of Research” section below, and others are cited in the various chapters. In addition, full descriptive reports of the excavations at Sand Canyon Pueblo and at the tested sites are being prepared for publication as Crow Canyon Center Occasional Papers, by Bruce Bradley and Mark Varien, respectively (see also Chapters 5 and 7 of this volume). Results of the upland survey have been presented by Michael Adler in his dissertation (Adler 1990; see also Adler, this volume).

In the remainder of this chapter, the project research design is briefly summarized, as are the history of the research program at the Crow Canyon Center and the history of the Sand Canyon Archaeological Project itself. Chapters 2 and 3 review the results of site survey in the Sand Canyon locality, and Chapter 4 presents some of the findings of an oral history study that focused on historic-period settlement, farming, and treatment of archaeological sites in the upland portion of the project area. Chapter 5 reports test excavations at a number of small sites, while Chapters 6 and 7 deal with intensive excavations at a small
Figure 1.1. The Southwest.
site (Green Lizard) and a large site (Sand Canyon Pueblo), respectively. Chapter 8 summarizes the work and plans of the Environmental Archaeology Program—a relatively new component of the Sand Canyon Project. In Chapter 9, results of an attempt to model prehistoric climate, agricultural production, and population in southwestern Colorado are presented. Chapter 10 concludes the volume with a commentary on our current state of knowledge regarding the research domains.

Structure of the Research

The Sand Canyon locality is part of the McElmo drainage unit (Figure 1.2) of the Northern San Juan or Mesa Verde branch of the Anasazi tradition (Eddy et al. 1984). The Sand Canyon locality refers to a study area of approximately 200 km² that was defined in 1986 by Crow Canyon researchers (Lipe and Bradley 1986, 1988). It is bounded by McElmo Creek on the south and Yellow Jacket Canyon on the north. The remaining boundaries are defined by an arc with a 7.5-km radius drawn to the west from Sand Canyon Pueblo and a similar arc drawn to the east from Goodman Point Ruin, except where it intersects and follows Alkali Canyon (Figure 1.2).

As defined by Willey and Phillips (1958), a locality is a spatial unit larger than a settlement and smaller than a region; here, it is intended to approximate the basic sustaining area for at least one Pueblo III period Anasazi community. It is also possible that more than one face-to-face, or "first-order," community might have occupied or used the space at some time (see also Kane [1983] and Lipe and Kohler [1984] for similar applications of the concept in the Dolores Archaeological Project research). In the context of the Sand Canyon Project, "locality" is a heuristic construct, designed to ensure that the research is conducted at a scale appropriate to investigating one or a few multisite communities.
The Sand Canyon locality was defined in a way that seemed likely to include the community directly associated with Sand Canyon Pueblo and its agricultural sustaining area. The locality's boundaries, although they follow natural features as much as possible, were set at approximately 7.5 km from its two largest Pueblo III sites—Sand Canyon Pueblo and Goodman Point Ruin—because 7.5 km is half the average distance between the six large Pueblo III aggregates that are nearest to Sand Canyon and Goodman Point pueblos. The underlying assumption was that these large sites are community or supracommunity centers and that the boundaries of their social and economic sustaining areas are likely to have been located approximately halfway between neighboring centers.

The period A.D. 1150–1300 was chosen as the temporal frame for the research. This period is also referred to as Pueblo III (and is sometimes dated at A.D. 1100–1300). The Pueblo III period was established as part of the Pecos Classification (Kidder 1927) and today is used as a temporal subdivision of the Anasazi tradition, with no particular implications as to specific cultural content or "developmental stage."

Pueblo III (A.D. 1150–1300) appeared to be a good period on which to focus our research because (1) by A.D. 1150, Chacoan influence in the northern Southwest had waned, but it is not clear what kinds of regional and local-level social or ideological systems had replaced it; (2) debates regarding sociopolitical complexity (or lack of it) in late prehistoric Pueblo communities had erupted in the early 1980s, and an intensive locality-level study investigating both large and small settlements promised to make a valuable empirical contribution to these debates; (3) explanations for the abandonment of the northern Southwest by the Anasazi must lie in the period A.D. 1150–1300, yet these reasons remain obscure; (4) very little modern-era research had been done on this period in the McElmo district, despite evidence for large Pueblo III populations there; (5) a substantial amount of useful comparative data was available on the Pueblo III period occupation of Mesa Verde National Park, located just southeast of the McElmo drainage unit; and (6) many of the Pueblo III sites in the Sand Canyon locality appeared to have relatively brief, single-component occupations, hence, some of the problems of temporal control and of understanding site-formation processes would be eased.

Community is a basic structuring concept in the Sand Canyon research program. Following Murdock (1949), a community is considered to be the maximal group of people who reside close to one another and who interact regularly on a face-to-face basis. In settlement pattern terms, a "first-order" community of this sort could consist of a single village or a cluster of dispersed hamlets or household compounds. Whether there are organizational and functional relationships among such first-order communities, and what the archaeological expression might be for higher-order organizations, are the obvious next questions. The Sand Canyon Project is attempting to investigate supracommunity organization at the locality level and, by reference to data and theoretical constructs from the literature, to place the Sand Canyon locality in a broader regional context.

Research Domains

Community Organization

The locality's pattern of numerous hamlet-size settlements clustered around larger pueblos appears to be one of considerable frequency and persistence in the more populous parts of the Mesa Verde Anasazi area (Rohn 1983, 1989), as well as in other parts of the Southwest (e.g., Reid 1989). At the outset of the project, it was expected that Sand Canyon Pueblo was contemporaneous with a large number of the small sites in the locality and that it probably served as a ceremonial, political, or economic center for a relatively large, dispersed population. It was also proposed that the site was predominantly nonresidential, or perhaps only seasonally occupied (Adams 1985b). Our research has shown, however, that Sand Canyon Pueblo did have a substantial residential population and that many of the Pueblo III sites in the cluster of small settlements near the head of Sand Canyon were abandoned before the construction of the large pueblo began about A.D. 1250. During the occupation of Sand Canyon Pueblo, the number of small sites occupied in and around upper Sand Canyon appears to have continued to decrease.

Whether or not Goodman Point Pueblo served as a community center in the locality prior to 1250, or whether it was partly or entirely contemporaneous with Sand Canyon Pueblo has not been determined. Castle Rock Pueblo, a "medium-size" settlement located in the McElmo valley at the mouth of Sand Canyon, does appear to have been at least partially contemporaneous with Sand Canyon Pueblo. In any case, defining the temporal and functional relationships between these large sites, and between the small and large sites occupied during the Pueblo III period, is a major aspect of this research domain.

The emphasis on community definition and community organization in the locality was chosen because (1) understanding these basic aspects of Anasazi social organization is essential for understanding many aspects of Anasazi prehistory in this area; (2) much of the current debate about the nature of prehistoric Pueblo social organization revolves around the degree of functional differentiation and hierarchy within and between social units defined at a community or locality scale, yet the organization of few Pueblo II or III period communities or localities has been intensively studied; and (3) the Pueblo III period settlements of the Sand Canyon locality provide an excellent...
opportunity for such a case study of organization. The research requirements in this problem domain are to infer population size and distribution, community boundaries and organizational structure, and intercommunity relationships within the locality.

Change and Abandonment

The emphasis on change and abandonment was chosen because the locality clearly displays a number of demographic, and possibly organizational, changes during the Pueblo III period. The area also participated in the large-scale abandonment of the region in the late 1200s. In the locality during the Pueblo III period, settlement patterns show a trend to increasing aggregation of the population in large pueblos, and also for settlements to move to the heads and sides of entrenched canyons, close to reliable sources of water. New forms of architecture appear, including some forms of "public architecture" that probably played a role in community or supracommunity integration. Examples of these are the D-shaped biwalled structure at Sand Canyon Pueblo; a poorly understood circular structure subdivided into four quadrants at the Goodman Point Ruin; isolated towers or tower-kiva complexes; masonry walls enclosing all or parts of aggregated pueblos; and possible plaza areas within some of the larger sites. In addition, great kivas and unroofed, circular enclosures appear at some sites. Architectural forms and site locations interpretable as defensive are also present, though they are far from ubiquitous.

The locality's population appears to have grown during the Pueblo III period, perhaps reaching its peak in the mid-1200s, only a few decades before the evidently rapid and complete abandonment of the locality, the northern San Juan region, and the Four Corners area in general. The Sand Canyon locality provides an ideal opportunity for a detailed case study that may reveal new insights into Pueblo III social, demographic, environmental, and adaptive change and eventual abandonment. Models of Pueblo change and abandonment developed outside the Sand Canyon locality can be tested there, and vice versa. Eddy et al. (1984) recognized that the lower McElmo drainage was an appropriate arena for the study of Pueblo II and Pueblo III developments in Southwestern Colorado. In summarizing research problems in the McElmo drainage unit, Eddy et al. (1984:43) note that

the emergence, growth, and decline of an aggregated settlement system during the late PII–PIII stages . . . and the role/influence of Chaco culture . . . is probably the most important problem, both from a practical and scientific sense, and yet, the most difficult because of the scale of the problem and the inaccessibility of some of the resource.

The scale and long-term commitment of the Crow Canyon Center's research program are addressing the difficulties that Eddy et al. (1984) recognized.

Regional and Theoretical Contexts

The third research domain—placing the Pueblo III occupation of the Sand Canyon locality in broader cultural and theoretical contexts—is essential if we are to use what other archaeologists have learned and if our results are to be meaningful outside our small study area. From the standpoint of placing the locality in regional cultural context, we need to know whether the patterns and trends we see in the Sand Canyon locality are repeated elsewhere in the northern Southwest and, if so, whether this is due to the operation of supracommunity social, political, or religious organizations, to diffusion operating through network-type relationships among individuals or small groups, or to common environmental or demographic pressures.

In the spring of 1990, the Crow Canyon Center began to actively address this need by hosting a working conference entitled "Pueblo Cultures in Transition: A.D. 1150–1350 in the American Southwest." This conference brought together a number of scholars working throughout the Southwest to summarize what is known about population distribution and sociocultural dynamics in their areas and to compare notes regarding regional and subregional trends and patterns (Lipe and Lekson 1990). A volume incorporating their papers is being edited by Michael Adler, Stephen Lekson, and William Lipe and will be published as an Occasional Paper of the Crow Canyon Archaeological Center.

The focus on community and supracommunity social organization and change plunges the Sand Canyon Project researchers into current debates over the complexity and scale of organization in prehistoric Southwestern Pueblo societies (e.g., Cordell and Plog 1979; Wilcox 1981; Ellis 1981; Upham 1982, 1985, 1989; Reid 1985, 1989; Lightfoot and Upham 1989a, 1989b; Orcutt et al. 1990). Comparative studies and synthesis of Sand Canyon Project data will be oriented toward general dimensions of organizational variation (Blanton et al. 1981) that are theoretically appropriate to characterizing community and supracommunity organization and their degree of complexity.

These dimensions of organizational variation are scale, differentiation, integration, and density. Scale (Barth 1978; Schwartz 1978) refers to the size of the geographic area occupied by a community or other organization and to its population size. Another aspect of scale is the "reach" of the organization, as indicated by the distance traveled by imported or exported goods. Differentiation has two aspects—horizontal differentiation, or the "functional specialization among parts of equivalent rank within a system," and vertical differentiation, or "rank differences among functionally diverse parts" (Blanton et al. 1981:21; see also Plog 1974 and Blau 1975). Vertical differentiation

* The conference was supported in part by Grant 48-32, Wenner-Gren Foundation for Anthropological Research.
implies inequality of access to economic, ideological, or military sources of power (Mann 1986). Integration refers to the interdependence of structural units within a society. This can be accomplished in various ways—through common ideology and cultural norms, reinforced through ritual; through flows of information, material, energy, or people among units (Blanton et al. 1981:20); through organizations, such as sodalities, that crosscut local segments (Service 1962); through structures, such as sequential hierarchies (Johnson 1982), that extend consensual decision-making beyond the small-group level; or through centralized managerial control (Lightfoot 1984; Flannery 1972), referred to by Johnson (1982) as “simultaneous hierarchy.” Intensity refers to the amounts of population, material, information, or energy use per unit area or per capita. The per-unit-area formulations of subsistence intensification have been employed in numerous theories of sociocultural evolution (e.g., Boserup 1965; Plog 1974; Earle 1980; Johnson and Earle 1987). The per capita formulation has had less use in characterizing organizations, but it underlies White’s (1949, 1959) “energy capture” evolutionary scheme and has been extensively used to document the unequal access to resources characteristic of vertical differentiation (e.g., Johnson 1989).

The dimensional approach to characterizing organizations involves the assumption that all four dimensions are always highly correlated (cf. Netting 1987; Feinman and Neitzel 1984; Leonard and Jones 1987) but provides the opportunity to determine how covariation does occur—e.g., whether aspects of scale are closely related to aspects of differentiation or intensity. The approach also facilitates comparison across time and space by focusing on general properties of organizations rather than on specific culture-historical configurations or on gross organizational types that are presumed to be cross-culturally recurrent, such as tribe or chiefdom. Comparative statements—regarding greater or lesser degrees of scale or differentiation, for example—are generally more demonstrable in archaeology than are statements that particular thresholds have been crossed or that a particular type of organization is present. Therefore, we hope to examine whether or not aspects of organizational complexity increased or decreased through time in the Sand Canyon locality and to make some general comparisons with community and supra-community organizations elsewhere—e.g., with Chaco Canyon or the Grasshopper site cluster. We believe that this approach will provide a solid perspective from which to relate our findings in the Sand Canyon locality to the specific models of prehistoric Pueblo organization that have been proposed over the past decade.

Instrumental Studies

A number of instrumental studies must be done in order to pursue the problem domains described above, especially the first two, which require new field and laboratory data to identify and interpret patterns of community organization and of sociocultural change and abandonment for the Sand Canyon locality. These instrumental studies include reconstructing past environments, building chronologies, identifying processes of assemblage and deposit formation, inferring the character of abandonment of structures and settlements, and estimating the length and continuity of occupation of structures and settlements.

In Chapter 8, Adams provides an overview of the approaches to environmental reconstruction being taken on the Sand Canyon Project, and Van West and Lipe (Chapter 9) summarize the results of an attempt to model past climate and agricultural productivity. Hegmon (1991) has recently completed an attribute-based study of Pueblo III pottery from the project area that promises to improve significantly the resolution of dating assignments based on ceramic assemblages. The use of tree-ring dates and architectural and sediment stratigraphy to establish fine-grained chronology is alluded to in several of the chapters that follow, especially those by Varien et al., Huber and Lipe, and Bradley. Assessments of the longevity of site occupation are one outcome of this chronological work, but considerable effort is also going into rate-of-accumulation approaches to this problem (Kohler and Blumman 1987; Varien 1990a; Lightfoot 1990; see also Varien et al., this volume).

Much work is also going into assessment of processes of assemblage formation. In addition to the increasingly voluminous literature on this subject, these assessments are guided by the work of Lightfoot (1990, 1992) at the Duckfoot site (another Crow Canyon project). A related topic is the abandonment of structures and settlements; chapters by Varien et al., Huber and Lipe, and Bradley provide some examples of how stratigraphy, evidence of the disposition of roof materials, and the composition of floor assemblages in structures are being used to characterize modes of abandonment. Related work at the Duckfoot site (Varien and Lightfoot 1989; Lightfoot 1990, 1992) is also providing helpful perspectives on assemblage-formation processes.

The Research Program

The Sand Canyon Project started in 1983, the same year that the Crow Canyon Center opened its doors as a private, nonprofit organization devoted to research and education in American archaeology. Before moving ahead to describe the history of research on the Sand Canyon Project, a brief discussion of the nature of research at the Center and of the development of its research infrastructure is in order. It is expected that this background information will give the reader a better understanding of how the Sand Canyon Project has developed.
One of the unique characteristics of archaeological research at the Crow Canyon Center is that virtually all of the fieldwork and much of the initial laboratory work involve participation by members of the public who are enrolled in educational programs designed to introduce them to Southwestern prehistory and to the nature of archaeological research. These educational programs are not designed to train participants to be professional archaeologists; rather, they utilize research involvement to provide a "hands-on" educational experience. Quite often the participants have had no previous archaeological experience and spend a total of less than a week in the field and lab during their stay at the Crow Canyon Center. Yet virtually all of the actual excavation at the sites is done by these participants, although the majority of the recording is done by the professional staff. Consequently, the data-gathering part of the research goes quite slowly and requires a high ratio of trained supervisors to educational-program participants.

Student interns also contribute to the research program, both in the field and in the laboratory. These are students who have had previous academic and research experience in archaeology and who spend a 10-week term at the Center, assisting the professional staff in excavations and laboratory operations. Interns also made up the majority of the field crews for the upland surveys reported by Adler in this volume.

The research program at the Crow Canyon Center began in 1983; in that year and 1984, the major focus of field research was the Duckfoot site (Varien and Lightfoot 1989; Lightfoot 1992), but work in the Sand Canyon area was assigned equal importance in 1985 through 1987. After the completion of excavations at Duckfoot in 1987, all field operations were shifted to the Sand Canyon locality.

The program started small and was built on a one element at a time, as funds became available and as the trajectory of the research demanded it. The initial focus—in 1983 and 1984—was fieldwork. The first full-time research staff members—E. Charles Adams and Bruce Bradley—spent approximately half the year in fieldwork and related educational programs and the remainder doing laboratory work and reports. In 1985, a laboratory director (Angela Schwab) was hired—in a seasonal position, but one that was converted to full time by the end of the year. Additional laboratory staff were added in succeeding years—first as part-time, then as full-time employees. There are now two full-time laboratory staff members, in addition to the lab director. Because the laboratory was understaffed in the early years of the program, it was not until 1990 that the backlog of unanalyzed materials was overcome. Currently, basic processing and analysis of materials obtained in one field season can be completed by the following spring, before the start of the next field season.

Laboratory and office facilities were initially in unheated trailers, so that laboratory work and writing had to be moved to the Center's dining hall during the winter. By the end of 1987, a new office/laboratory/classroom building provided a "home" for the research staff. A third full-time field archaeologist was also hired in 1987, and two assistants were added in subsequent years—first as seasonal staff, and then as full-time employees in 1991. Development of a computer database was planned in 1988, and basic computer equipment was purchased that year. In 1989, development of the database began, and two part-time staff members with expertise in computer applications were employed in 1990. By the end of that year, the computer database was operational. The year 1990 also saw the initiation of the Environmental Archaeology section of the research program. This brought together and coordinated the efforts that were already underway in this area and provided the staffing to do additional work that was needed.

Although descriptive reports of fieldwork were prepared each year from the beginning of the research program, these were photocopied rather than printed and had a limited distribution. In 1988, it was decided that the Crow Canyon Center should start its own research publication series, so that technical monographs reporting the results of its research could be produced. The series was entitled "Occasional Papers of the Crow Canyon Archaeological Center." The first volume was completed in 1989 (Lipe and Hegmon 1989) and made available for sale early in 1990.

Occasional Paper No. 1 was edited and formatted in camera-ready form by staff members working outside their primary jobs, and often after hours. In 1991, it was possible to establish a Publications section within the research program, with additional equipment and a small staff devoted to publications support. With the current level of staffing, the Center expects to be able to publish two or three book-length monographs a year. This progress report on the Sand Canyon Project is Occasional Paper No. 2, and several other works of similar or greater length are "in the pipeline," in various stages of editing.

Preparation of a synthesis of research results from the Sand Canyon Project is planned for 1995. Although a number of special analyses and comparative studies employing data from multiple sites have been done or are underway by staff and affiliated researchers and graduate students, additional studies will be required. A focus on these studies is planned for 1992 through 1994.

History of Sand Canyon Project Research

The Sand Canyon Archaeological Project had its beginnings in a decision by Crow Canyon Center archaeologists in 1983 to investigate Sand Canyon Pueblo, a very large, late Pueblo III site located near the head of Sand Canyon about 19 km (12 miles) west of the Crow Canyon campus.
The decision was based on several considerations, including the relative lack of work done on late Pueblo III settlements outside the Mesa Verde since the 1940s, and especially on the very poor level of knowledge about the very large, late settlements in the greater Montezuma Valley, such as Sand Canyon Pueblo, the Yellow Jacket Ruin, the Goodman Point Ruin, etc. (Adams 1983). Another consideration was that Sand Canyon Pueblo appeared to have been occupied relatively briefly, so that assemblies found there could be related to a single component, without the complexities found in sites having multiple occupations.

Sand Canyon Pueblo was mapped in 1983, and excavations were begun on a small scale in 1984, under the direction of E. Charles Adams and Bruce Bradley. Bradley took over direction of the work in 1985 and spent a full field season there that year. The research design for Sand Canyon Pueblo proposed excavation of a sample of kiva units—a kiva and all directly associated rooms, other structures, midden deposits, etc. The kiva units that were excavated were selected judgmentally to sample three categories of architectural complexes, or blocks, at Sand Canyon Pueblo, distinguished on the basis of their overall room-to-kiva ratios (see Bradley, this volume, for a fuller discussion of the sampling design). This strategy was maintained through 1989, resulting in the complete excavation of six kiva units in as many architectural blocks (Adams 1985a, 1986; Bradley 1986, 1987, 1988a, 1990, 1991b; Kleidon and Bradley 1989). At the close of the 1989 season, Bradley began work on a comprehensive report on the six seasons of excavations that had been conducted to that date at Sand Canyon Pueblo. No fieldwork was done at the site in 1990, but Bradley returned to the field in 1991 for a 12-week season, to focus on excavations of elements of “public architecture” at the site (Bradley and Lipe 1990).

Although the original research design for the Sand Canyon Archaeological Project (Adams 1983) envisioned systematic survey and site testing to place Sand Canyon Pueblo in a broader locality and community context, it was not possible to begin systematic survey until 1985 and 1986. During the summers of those years, Carla Van West directed surveys on lands surrounding Sand Canyon Pueblo (Van West 1986; Van West et al. 1987) (Figure 1.3).

In late 1986, Bill Lipe and Bruce Bradley prepared a National Science Foundation (NSF) proposal (Lipe and Bradley 1986) that represented an updated research design for the Sand Canyon Project, replacing Adams’s 1983 document. In the 1986 design, the Sand Canyon study area was expanded to approximately 200 km², and was referred to as the Goodman Point–Sand Canyon locality (the “Goodman Point” label quickly dropped away, but “locality” stuck). The central research problem stated in the 1986 document was understanding the social organization of the Anasazi community that was centered on Sand Canyon Pueblo. A secondary objective was to understand the extent to which Sand Canyon Pueblo and the Sand Canyon community had social and cultural connections and influence at a regional level. Expansion of the intensive survey was proposed, as was excavation in small sites contemporaneous with Sand Canyon Pueblo, to obtain data that would permit assessment of the scale and organization of the Sand Canyon community.

The 1986 NSF proposal also identified the need for “instrumental” studies—those studies that are necessary to support the more direct attacks on the problem of locality social organization. Funds were awarded by NSF in mid-1987 (grant BNS-8706532). That summer, two survey teams carried out intensive survey under the direction of Michael Adler (Adler, this volume; Adler 1988, 1990), and intensive excavations at the Green Lizard site were begun by Edgar Huber. This site, which has two kivas and an associated roomblock, is located in Sand Canyon about 1 km below Sand Canyon Pueblo. Huber fully excavated the western half of the site in 1987 and 1988 (Huber and Lipe, this volume; Huber and Bloomer 1988; Huber 1989), acquiring data on a kiva unit comparable to those being intensively excavated at Sand Canyon Pueblo by Bradley. Another NSF proposal was submitted early in 1988 (Lipe and Bradley 1988). Although it was not funded, it served the Sand Canyon Project as an updated research design.

In the spring of 1988, the Crow Canyon Center organized a symposium at the Society for American Archaeology meetings in Phoenix on the topic of architectural evidence for integrative rituals in prehistoric Southwestern pueblos. The symposium participants agreed to revise their papers and submit them for publication by the Crow Canyon Center, with Bill Lipe and Michelle Hegmon as editors. Most of the original papers were extensively rewritten, several new ones were added, and the resulting book went to press late in 1989, entitled The Architecture of Social Integration in Prehistoric Pueblos (Lipe and Hegmon 1989). In addition to case studies, the book (1) provided some theoretical bases for using architecture as a basis for inferring social integration; (2) concluded that most PI-PII Mesa Verde kivas probably had domestic as well as ritual functions; (3) identified public architecture as indicative of community level integration; and (4) posited a major change in Anasazi patterns of ritual and social integration about A.D. 1300, immediately after the abandonment of the San Juan drainage.

A project related to the “architecture of social integration” was begun in 1990 by Susan Kenzle, a graduate student at the University of Calgary. Her study concerns “Architecture With Unknown Function” (AWUF). These remains consist of low walls, isolated heaps of stone, and other features that occur on and around some of the larger thirteenth-century sites. It appears that at least some of these features may have to do with defining settlement boundaries, delineating symbolically important connections between parts of the site, and perhaps providing some...
type of visible ritual or symbolic mapping of the space in and around the settlement (Thompson et al. 1991).

In the summer of 1988, Peter Gleichman surveyed a portion of lower Sand Canyon (Figure 1.3) for the Bureau of Land Management (Gleichman and Gleichman, this volume; Gleichman and Gleichman 1989). In this survey, the Gleichmans used recording forms and survey procedures compatible with those developed for the earlier Crow Canyon surveys directed by Van West (Van West et al. 1987) and Adler (Adler 1988). In 1990, under its cooperative management agreement with the Bureau of Land Management, Crow Canyon received funds to conduct additional survey in Lower Sand and East Rock canyons. This work was directed by Michael Adler (Adler and Metcalf 1991) and is not reported in this volume.

In 1988, Mark Varien began a testing program focused on the smaller Pueblo III sites located in the central part of the Sand Canyon locality (Figure 1.3). This program has continued through 1991 under his direction (Varien 1990b, Kuckelman et al. 1991). As with the Green Lizard excavations, the purpose of this work is to obtain comparable data from smaller sites that were contemporary with Sand Canyon Pueblo or that date to the 50–100 years preceding its construction in about A.D. 1250. Unlike the Green Lizard work, in which a kiva unit was intensively excavated, the site testing program relies on stratified random samples of test pits at each site. Through the 1991 field season, 13 sites had been tested in this way. Reports of the 1988–1990 fieldwork are summarized by Varien et al. in this volume.

Sites tested in the 1988 and 1989 seasons were located within 2 km of Sand Canyon Pueblo. In 1990, crews directed by Ricky Lightfoot and Jim Kleidon extended the site testing program to several sites in lower Sand Canyon and the adjacent McElmo valley. One of these—Castle Rock Pueblo—may have as many as 75–100 rooms and is by far the largest site tested so far. Testing at this site continued in 1991, and additional judgmentally selected portions of the site will be excavated in 1992.

The testing program is geared to obtaining comparable samples of assemblages from each site, as well as comparable information about features and architecture. Additional objectives are to understand the chronology of each
site and to infer its continuity and longevity of occupation. More information about the objectives and methods of the testing program are presented in Chapter 5 (Varien et al.).

Next to Sand Canyon Pueblo, the largest post-A.D. 1150 site in the Sand Canyon locality is the Goodman Point Ruin. Since the development of the 1986 research proposal and design (Lipe and Bradley 1986), it had been recognized that information from the Goodman Point site would play a key role in understanding community organization in the locality. In particular, whether Goodman Point was contemporaneous with Sand Canyon Pueblo or just preceded it would have a major bearing on our interpretations of community organization. If Goodman Point and Sand Canyon pueblos were contemporaneous, there would be two "community centers" of approximately equal size within 5 km of each other. But if Goodman Point was the earlier, it might indicate that the whole locality had a single central site that moved from the head of Goodman Canyon to the head of Sand Canyon in the mid-1200s.

Adler mapped the Goodman Point site in 1987 (Adler 1988), and Lightfoot (1989) presented a proposal to the National Park Service for testing the site under an Archaeological Resources Protection Act permit. The testing proposed for Goodman Point required excavating substantially less than 1 percent of the site by area and was designed to acquire data that would be comparable to those being obtained by the small (and medium) site testing program. The application was turned down by the National Park Service because its current draft management plan for the site places it in indefinite "reserve" from excavation or other surface-altering modes of research, so that it may be kept intact for archaeological research and interpretation at some unspecified time in the future. Discussions of the possibilities for permissible types of research at the Goodman Point site are continuing between Crow Canyon Center and National Park Service personnel.

In January of 1989, the Crow Canyon research staff assembled at the Recapture Lodge in Bluff for a "research retreat" to consider goals and future directions for the research program. Stephen Lekson and David Braun were invited to the meeting as outside participants and discussants, to provide professional perspectives from outside the Crow Canyon staff. The principal new direction established at the meeting was to make the understanding of the abandonment of Sand Canyon Pueblo, the Sand Canyon locality, and the northern San Juan area a primary research goal, equivalent to the previous primary focus on community organization. This new goal has subsequently been restated as an attempt to understand social, cultural, and environmental change in the period A.D. 1150 to 1300 for the Sand Canyon locality and, to the extent possible, for the northern San Juan area. In this perspective, the late thirteenth-century abandonments remain important foci, but it is recognized that understanding them will require tracking change in the immediately preceding periods as well.

A significant conclusion reached at the 1989 research retreat was that important changes, such as abandonment, that affected the Sand Canyon locality could not be understood without considering a much broader cultural and environmental context. This was not to deny the importance of gaining a good understanding of the pattern and dynamics of change in the Sand Canyon locality. Rather, it was meant to recognize that broader patterns had to be considered as well, including what opportunities existed elsewhere in the Southwest that might have made abandonment of the locality and the northern San Juan seem more attractive to Anasazi populations than staying in the area.

To develop a larger context for the Sand Canyon Project work, Lekson and Lipe planned a conference to bring together researchers from the entire Pueblo Southwest to discuss the pattern and processes of change in the period A.D. 1150–1350. A small grant was received from the Wenner-Gren Foundation, and the conference was held in March 1990. The Crow Canyon research group prepared a paper on "what happened" in the Mesa Verde area during the targeted period (Varien et al. 1990), and Lipe and Lekson summarized the results of the conference at the Society for American Archaeology meetings in April 1990 (Lipe and Lekson 1990). There was general agreement among the Crow Canyon archaeologists and the other conference participants that the conference had been very successful in raising consciousness about the degree to which demographic and social change was integrated over a huge area during the A.D. 1150–1350 period.

Another conclusion reached by the attendees at the original research retreat in 1989 was that a serious attack on the problem of abandonment would require a more intensive and systematic investigation of environmental data—both for a better understanding of prehistoric subsistence and natural resource economies and for a reconstruction of natural and anthropogenic environmental change that may have affected Anasazi adaptations in the study area in the twelfth and thirteenth centuries. Consequently, in mid-1989, Dr. Karen Adams was engaged to plan a comprehensive program of environmental archaeology, to be carried out under her direction (see Adams, this volume). Adams was already quite familiar with aspects of the Sand Canyon Project, having been the Center's primary consultant on macrobotanical remains for several years. The Environmental Archaeology section was designed to have a public educational component, as did other aspects of the research program. Mark Hovezak joined the staff as an assistant to Adams in early 1990, and the new program became fully functional by mid-1990.

In 1989, Marjorie Connolly initiated an oral history project focused on settlement and agriculture in the Goodman Point area, which lies within the Sand Canyon locality. Although the historic Goodman Point community is of interest in its own right, it was also thought that documenting early twentieth-century patterns of land use and farming
would prove valuable for understanding prehistoric Anasazi settlement and farming strategies in the same area. A secondary objective was to document changes in the archaeological record that were due to farming activities, so that survey data from cultivated fields could be better evaluated. Connolly's findings are summarized in this volume and in a previous report (Connolly 1990).

From 1987 through 1990, Carla Van West designed and completed a basic environmental study: a model of potential agricultural productivity in Southwestern Colorado, as conditioned by soil moisture availability (Van West and Lipe, this volume; Van West 1990). The model utilizes Geographic Information Systems computer technology and data on precipitation derived from tree-ring sequences to plot Palmer Drought Severity Indices for soils in an approximately 1800 km² area that includes the Sand Canyon locality. The data set and model promise to be extremely useful in studying the effect of climatic and locational variability on Anasazi farming adaptations in the Sand Canyon locality and surrounding areas.

In 1991, Michelle Hegmon completed an attribute-based study of stylistic change in Pueblo III white wares (Hegmon 1991). Working with selected assemblages that were well dated by dendrochronology, Hegmon was able to identify distinctive attribute frequency profiles for the late A.D. 1100s and the early, middle, and late 1200s. This represents a considerable advance over previous levels of stylistic discrimination among Pueblo III ceramic assemblages and promises to improve our understanding of settlement pattern change and composition of community clusters at various points in time during the Pueblo III period.

Fieldwork focused on the Pueblo III occupation of the Sand Canyon locality is expected to continue through 1994. A synthesis of research results, addressing the problem domains outlined above, will be prepared in 1995. Publication of full descriptive reports of archaeological contexts at excavated and tested sites is also planned. The Crow Canyon Center's research program will continue after the conclusion of planned work on the Pueblo III occupation of the Sand Canyon locality. A final decision has not been made, but an attractive research direction would be to focus on the A.D. 1000–1150 period in the greater Montezuma Valley, including a consideration of the nature of the "Chacoan" presence in the area.