In the late eleventh and early twelfth centuries, the ancient pueblo sites of Aztec and Salmon in the Middle San Juan region rapidly emerged as population and political centers during the closing stages of Chaco’s ascendancy. Some archaeologists have attributed the development of these centers to migration and colonization by people from Chaco Canyon, 75 km to the south (e.g., Irwin-Williams and Shelley 1980). Others have suggested that the so-called Chacoan “system” was largely the result of emulation of Chacoan characteristics by local groups in outlying areas (e.g., Van Dyke 1997; papers in Kantner and Mahoney 2000). This proposal explores these alternatives—migration and emulation—in the emergence of Aztec and Salmon. We propose to compare the architecture and material culture of Aztec, Salmon, and several smaller contemporary communities with Chaco Canyon. The distinctive settlement history of the Middle San Juan region offers an extraordinary opportunity to explore a particular region before, during, and after the interval of interest. If migration is indicated by the empirical data, this study will further our understanding of what draws migrants to a particular area, how multicultural communities develop and are sustained, and the effects of immigration on the declining parent community. Toward these ends, we develop methodologies to test two distinct but interrelated processes that could have produced the unique architecture and material culture found in the Middle San Juan region in the late 11th and early 12th centuries: 1) migration to the Middle San Juan as part of a program of Chaco expansion; 2) exchange of Chacoan prestige goods and emulation of Chacoan attributes by local residents of the Middle San Juan without substantial population movement. We want to emphasize that we do not view these processes as not mutually exclusive; both migration and emulation may have taken place at different settlements in the region. This research also offers an opportunity to examine how great-house communities, such as Aztec and Salmon, evolved into regional centers in their own right. Some archaeologists use the Navajo name “Totah” to describe the Middle San Juan region (e.g., McKenna and Toll 2001; Toll 2004; Wheelbarger 2003). We prefer the neutral but longer, “Middle San Juan region” because of modern political and land claim issues between the Pueblos and Navajos. Figure 1 shows the Middle San Juan region and the locations of Aztec, Salmon, and the other Puebloan communities slated for research.

Research by archaeologists associated with the National Park Service’s (NPS) Chaco Center and other scholars indicates that between AD 1000 and 1130, Chaco Canyon functioned as the political, social, economic, and ritual center of the northern Pueblo world (Cameron and Toll 2001; Lekson 2000; Powers et
biological and social groups were present in Chaco Canyon. For the purposes of our study, then, we do not consider the "Chacoans" as a homogeneous group is problematic and that at least two or more distinct (possibly elites) taller and healthier than others (perhaps commoners). These findings indicate that status differences were present among the Chacoan populations, with some residents suggesting that the "Chacoan" has grown, and in popular circles, has taken on an ethnic or tribal dimension. Lay people often wonder what happened to the Chacoan "tribe." Recent research shows the danger of considering the Chacoan "system" (e.g., Durand and Durand 2000; Jalbert and Cameron 2000; Kantner and Mahoney 2000; P. Reed 2004a; Van Dyke 1999). The Middle San Juan region figures strongly in modified interpretations of Chacoan Outliers. As interpreted by the original excavators of Salmon and Aztec ruins, Cynthia Irwin-Williams and Earl Morris, respectively, Chacoan migrants established colonies at Salmon and Aztec in the late 11th and early 12th centuries as part of Chacoan expansion to the north. Subsequent research suggests that other communities in the region emulated the distinctive Chacoan architectural style. The decline of Chacoan political influence by about AD 1130 led to the rise of new centers across the Pueblo landscape, including sites in the Northern San Juan-Mesa Verde region and in the Zuni-Cibola region to the south. As part of this process, an important regional center emerged in the Middle San Juan region, with the Aztec Community (now managed as Aztec Ruins National Monument) as its hub (Brown et al. 2002; Lekson 1999; McKenna and Toll 2001; Reed 2002).

Despite the importance of Aztec to our understanding of the Chacoan and post-Chacoan Pueblo world, the architecture and collections from the site have never been adequately analyzed or interpreted. Although the construction of both Aztec and Salmon has been attributed to Chacoan colonization and migration, along with a later reoccupation by Mesa Verde migrants from the north, neither of these hypotheses has been systematically investigated. With renewed archaeological interest in the region, including the Center for Desert Archaeology’s recent research initiative at Salmon Ruins (Reed 2004b; see also Brown 2004; Toll 2004; Wheelbarger 2004), we feel the time is ripe to reconsider these longstanding assumptions and to test them with new models and methods derived from recent research on migration.

With funding from NSF, we propose to explore Chacoan influence in the Middle San Juan using data from the ancient Puebloan great-house sites of Aztec, Salmon and three sister communities in the Middle San Juan region. We will also investigate changes in the Middle San Juan following the decline of the core great houses in Chaco Canyon. We pose the following research questions: Did social groups from Chaco Canyon migrate to the Middle San Juan region and, if so, were these groups the founders of Salmon, Aztec, and smaller great houses? Or, was the rise of these great-house communities part of a broader regional phenomenon involving emulation of Chacoan architecture and other traits by local groups?

Our research plan focuses on analyses of existing museum collections with a limited program of new fieldwork. Analyses will focus on Aztec’s extensive ceramic, textile, and basketry collections in order to compare them with the recently studied collections from Salmon Ruins and a sample of materials from Chaco Canyon. Fieldwork will include architectural recording, mapping, in-field analyses, and stratigraphic testing at three Chacoan and post-Chacoan era Puebloan communities in the Middle San Juan and a detailed architectural analysis of the East Ruin at Aztec, New Mexico. Through these studies, we will collect the data necessary to understand the nature of Chacoan presence in the Middle San Juan region. To interpret our data, we will use a method for assessing the occurrence and scale of migration derived from the work of Sackett (1985), Carr (1995), Clark (2001), Lyons (2003), Stark et al. (1998); and Stone (2003), among others. We discuss this model and methodology in greater detail in the following sections.

Before detailing our research design and methodology, we digress briefly and offer a caveat. At the outset, we recognize the difficulty and hazards of using the term ‘Chacoan’ in our proposed research, particularly for studying sites and collections from outside Chaco Canyon. In origin, of course, Chacoan means derived from Chaco Canyon and should be limited to a specific series of material culture categories (great house architecture, great kivas, specific ceramic types such as Chaco B/w, etc). In usage, however, “Chacoan” has grown, and in popular circles, has taken on an ethnic or tribal dimension. Lay people often wonder what happened to the Chacoan “tribe.” Recent research shows the danger of considering the Chacoans as a single, distinct ethnic group. Skeletal studies by Akins (1986) and more recently by Schillaci (2003) have revealed the presence of distinct biological populations in Chaco Canyon. Akins’s work also suggests that status differences were present among the Chacoan populations, with some residents (possibly elites) taller and healthier than others (perhaps commoners). These findings indicate that considering the “Chacoans” as a homogeneous group is problematic and that at least two or more distinct biological and social groups were present in Chaco Canyon. For the purposes of our study, then, we do not
consider Chacoan material traits indicative of a single ethnic or biological population. We acknowledge the diversity subsumed under the “Chacoan” label. Our use of Chacoan refers to a specific suite of material culture traits including architecture, pottery made with a specific recipe, and certain textiles, baskets, and other perishables.

RECENT ARCHAEOLOGICAL RESEARCH FOCUSING ON MIGRATION

Migration has recently reemerged in the archaeological literature after a decades-long slumber (Anthony 1990; Clark 2001; Duff 2002; Lyons 2003; Lyons and Clark 2004; Renfrew 1987; Rouse 1986; Spielmann 1998; Stone 2003). Decades of dissatisfaction with the invocation of migration as a prime mover in archaeological models stems from a number of factors (Adams et al. 1978); most notably, the ad hoc and post hoc nature of most migration arguments. In the past, many archaeologists have been content to attempt to document migrations while offering little in the way of explanation.

The “new wave” of migration studies stands in sharp contrast to the past. Newer studies have brought strong theoretical and methodological approaches to the study of population movement, drawing on work in demography and cultural geography, and from broader anthropological theory. In short, new work in migration uses a methodology “for examining prehistoric migration [that is] dependent upon an understanding of the general structure of migration as a patterned human behavior” (Anthony 1990:895).

Migration is often conceived in terms of “push” and “pull” factors – conditions that encourage movement away from a homeland (the push) and the incentives that attract immigrants to a new land (the pull) (Anthony 1990; Lee 1966). Common push factors can include declining environmental conditions at home (e.g., reduced rainfall, erosion and downcutting, over-exploitation), changing social relations (e.g., conflict, factionalism), and population increase leading to a resource-population imbalance. Hence, migration itself can be considered a “push” factor, generating more movements in a “snowball” effect. Pull factors include favorable environmental conditions in the new land, a welcoming social landscape (connections to kin groups or others previously established in the new territory), and the underlying belief that migration will lead to a better life.

Jeffery Clark (2001:2) defines migration as “long-term residential relocation beyond community boundaries by one or more discrete social units as a result of a perceived decrease in the benefits of remaining residually stable or a perceived increase in the benefits of relocating to prospective destinations.” Clark identifies four primary topics of migration research: 1) evaluating occurrence and scale; 2) elucidating possible motives; 3) reconstructing the organization and logistics of migrant units; and 4) assessing the impact in both homeland and destination areas. Evaluating the occurrence and scale of migration in the Middle San Juan region is the crucial first step and the primary focus of this proposal.

Building upon approaches to artifact style put forth by Lewis Binford (1963), James Sackett (1985), Christopher Carr (1995), and others, and the theoretical contributions by William Adams and his colleagues (1978) and David Anthony (1990), Southwestern archaeologists Clark (2001) and Patrick Lyons (2003) have recently developed sophisticated methodological and theoretical approaches for detecting migration in the archaeological record, employing concepts of cultural drift, isochrestic variation, and technological style to distinguish between high-visibility patterns associated with the purposeful communication of ethnicity and other social messages and low-visibility patterns produced through more unconscious processes of enculturation. As both have argued, high visibility attributes of artifact and architecture are most susceptible to emulation and as such are not reliable indicators for migration. In contrast, low visibility attributes, reflecting shared learning frameworks, are the best indicators of actual population migration. These important premises form the basis of the methodology we will use to test our hypotheses about the Middle San Juan, which we describe in our research plan.

CHACOAN INFLUENCE IN THE MIDDLE SAN JUAN: RECENT RESEARCH AT THE AZTEC AND SALMON COMMUNITIES

By AD 1050, Chacoan influence in the Middle San Juan was emerging. The available data indicate that the Great North road emanating from the Chacoan site of Pueblo Alto was built between AD 1050 and 1080 (Kincaid 1983; Obenauf 1980; Roney 1992). Construction of the North road preceded the construction of the great houses at Salmon and Aztec, and other locales in the Middle San Juan.

Salmon Pueblo was built on the north bank of the San Juan River between AD 1090 and 1100. Earlier sites with Chacoan architecture (e.g., Chimney Rock—built as early as AD 1075 and the Wallace site in Colorado—perhaps built in the AD 1060s) are present to the north of Salmon. But, the construction of the 250-room Salmon Pueblo in an area that was largely unsettled previously represented a substantial
increase in Chacoan influence and/or presence. By AD 1115-1120, the internal architecture of Salmon Pueblo had dramatically changed. Large, original rooms were divided in two, circular kiva structures were added to a number of rooms and in the plaza, and kiva-like features (including benches, superfloor ventilation systems, sipapus, and niches) were added to other rooms.

Cynthia Irwin-Williams and her colleagues conducted intensive excavations at Salmon Pueblo in the 1970s (Irwin-Williams and Shelley 1980). These studies led Irwin-Williams to develop a typology of community types--dispersed, aggregated, and nucleated--that is still used by Southwestern archaeologists (Irwin-Williams 1983). Irwin-Williams also explicitly proposed (but never convincingly demonstrated) that Salmon and Aztec were established as Chacoan colonies. Research and analysis at Salmon Ruins ended prematurely in 1980, with the publication of a voluminous report to the funding agencies (Irwin-Williams and Shelley 1980). Thus, Irwin-Williams’s colonial model for the origin of Salmon has yet to be fully explored.

In late summer 2001, the Center for Desert Archaeology and Salmon Ruins Museum entered into a four-year partnership to renew the research potential of Salmon as part of the Center’s Heritage Southwest Project. Headed by Paul Reed, the multiyear research project initiated at Salmon Pueblo is intended to bring fruition to the great effort put forth by Irwin-Williams and her staff during the 1970s (Reed 2002). A major thrust of the research effort is a new look at Salmon Pueblo, not only as the Chacoan community conceived by Irwin Williams (1983), but in its regional Middle San Juan context as well. Publication of a synthetic volume and supporting technical volumes (which will condense and integrate the technical findings of the original 1980 report) is the primary goal of the Salmon Project.

The Center’s Salmon Project focuses on the two occupations of Salmon Pueblo: 1) the Primary or Chacoan occupation from AD 1090 to 1120; and 2) the Secondary, local San Juan period from AD 1120-1290 (Reed 2002). Important issues include different uses of architecture and artifacts during the two occupations, and the emergence of craft specialties during both periods. Specialized, focused analyses of the textiles, basketry, and ceramics comprise a substantial portion of the Center-sponsored effort at Salmon. As discussed below, the findings of these analytical projects have already contributed to the central research issues of Chacoan presence and local craft production that comprise the major thrust of the current proposal. In addition, the new synthesis underway for Salmon Pueblo will provide a long overdue interpretation of the community within the context of regional community and demographic processes across the greater Northern San Juan region over several centuries (e.g., Cameron 1995; Duff and Wilshusen 2000; Lekson and Cameron 1995; Lipe and Ortman 2000; Reed 2000; Reed and Hensler 2002; Varien 1999; Varien and Wilshusen 2002).

We have suggested that many of the original builders and inhabitants left Salmon by AD 1120 (Reed 2002). Where did this group go? One possibility is north, to the East Ruin at Aztec Ruins. The East Ruin was initially constructed between AD 1115 and 1125, as a companion site to Aztec’s West Ruin (built between AD 1105 and 1125). Thus, Aztec’s West Ruin was built about 15 years after Salmon’s construction, and represented, along with complex of sites at the Aztec Community, the most visible manifestation of Chacoan influence or presence in the Middle San Juan.

**Aztec Ruins**

Archaeologist Earl Morris investigated Aztec Ruins for the American Museum of Natural History (AMNH) and later the National Park Service in the late 1910s and early 1920s, during which time he excavated roughly 75 percent of the West Ruin (Morris 1915, 1919, 1921, 1924, 1928). Although Morris published several reports and articles, relatively few artifacts have been studied and published, leaving most of the collection from Aztec unanalyzed and unknown. A collection of this size, diversity, and significance—one containing not only the stone and ceramic artifacts commonly encountered at most open sites, but also one remarkably rich in textiles, basketry, wooden artifacts, and organic raw materials—will never be replicated through contemporary Southwestern fieldwork. In addition to architecture, these classes of artifacts are rich in information pertaining the enculturative backgrounds of the inhabitants and are essential for determining if the inhabitants were local groups or migrants. Therefore, it is imperative that knowledge about the collections and architecture from the Aztec Community be made accessible both to the scholarly community and the general public.

The Aztec Community has been discussed recently with regards to Chacoan and post-Chacoan regional developments. During the late 1980s, archaeological survey identified an extensive series of sites and features spatially associated with Aztec Ruins that reflect a much greater Chacoan cultural landscape than previously known (Stein and McKenna 1988). This landscape is extremely formalized and demonstrates large-scale community planning and construction that was centrally coordinated to highlight...
the importance of the main ruins group, particularly the enormous great houses at Aztec West and Aztec East. In 1999, Steve Lekson stressed the important position of Aztec in the Chacoan world and discussed its role as a descendant Chacoan “capital” from the mid-12th through the end of the 13th century (Lekson 1999). In conjunction with the 1980s survey data, Lekson’s model clearly identifies Aztec as the largest and most important center in the Middle San Juan region at a time when Chaco Canyon was in decline.

During the 1990s, NPS personnel initiated a research effort emphasizing architecture and tree-ring dating. This ongoing work has focused largely on Aztec’s West Ruin, but also has revealed some dramatic differences between the Aztec East and West ruins (Brown et al. 2002; Windes and McKenna 2001). These results indicate that the West Ruin was centrally planned and rapidly constructed in a fashion similar to the post-AD 1020 great houses in Chaco Canyon and Salmon Pueblo. The East Ruin was planned as part of a symmetrical community layout at about the same time that the West Ruin was constructed (early 1100s), but reveals a different construction history characterized by modular architecture and incremental construction that persisted through much of the 12th and 13th centuries. The additional field research proposed here will help to clarify these comparisons and identify the Chacoan role in the construction and settlement of the individual great houses at Aztec.

Most recently, the Center for Desert Archaeology-Salmon Ruins Initiative received a 2004 Western National Parks Association grant for a pilot study of the ceramic and textile craft industries at Aztec Ruins. The ultimate goal of this study is to explore socioeconomic relationships among sites in the Middle San Juan and with outside regions by tracking the production and exchange of craft goods such as ceramics, textiles, and basketry at the Aztec Community, Salmon Pueblo, and Chaco Canyon. The data will provide direct information regarding the origins of ceramic and perishable products from Aztec, thereby shedding light on the larger issue of Chacoan presence and influence at Aztec.

A PROPOSED METHODOLOGY FOR DISTINGUISHING BETWEEN MIGRATION AND LOCAL EMULATION IN THE MIDDLE SAN JUAN

Studies by Sackett (1977), Carr (1995), Clark (2001), Lyons (2003), and others have shown that highly visible classes of material culture (e.g., public architecture, ritual objects used in public ceremonies, high-status objects, items of adornment) as well as visible attributes (e.g., design elements) have a high communication potential and attract viewer attentiveness. Such objects tend to be the focus of emulation and can be distributed widely without migration. In contrast, low visibility classes of material culture (domestic architecture layout, utilitarian objects, food preferences) and low visibility attributes of artifact manufacture and use (hidden technological styles, raw material choices, use-wear patterns) are rarely displayed intentionally and reflect learned patterns of behavior shared by people with a common settlement history and enculturative background. Such attributes are less likely to be imitated by others, are more stable through time, and are the best indicators of actual population movement.

Our project makes use of these concepts to develop a specific methodology for assessing whether a significant influx of people from Chaco Canyon occurred in the Middle San Juan region, how such a migration might have been organized, or whether the presence of Chacoan influences in the Middle San Juan might be the result of exchange or emulation of Chacoan attributes by local groups. We recognize that these processes are highly complex and not mutually exclusive, and that all may have been operating in the Middle San Juan at one point or another. Our goal is to disentangle local and migrant traits and attributes in different classes of material culture to identify which of these processes was dominant during specific periods of time.

Five classes of material culture—architecture, ceramics, woven fabrics, sandals, and baskets—will be evaluated for evidence of local and nonlocal production. The greatest strength of our research partnership is our ability to integrate both portable and non-portable classes of material culture into our study and our certainty that at least one class, architecture, was locally made. Although we would like to include other classes of artifacts—ground stone, chipped stone, worked wood, and especially ritual objects—in our proposal, it is beyond our budget to do so at this point. Once the project is implemented, however, we expect other researchers to initiate specialized analyses to complement this research.

Interpreting the distinctive patterns in Middle San Juan material culture and architecture is critical to understanding how the region developed. Table 1 identifies examples of data classes we will use to differentiate low and high visibility traits. Table 2 builds on Table 1, and shows a matrix linking high and low visibility traits to inferences of migration or emulation in the Middle San Juan. Note that the attributes on these tables require a site-by-site assessment and that various combinations are possible. In the Research Plan section below, we develop in detail specific methodologies for each category of material culture.
Table 1. Examples of high and low visibility attributes used to differentiate between patterns of migration and local emulation.

<table>
<thead>
<tr>
<th>Material class</th>
<th>High visibility attributes (linked to local emulation of Chacoan styles)</th>
<th>Low visibility attributes (suggesting the presence of Chacoan migrants)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architecture</td>
<td>Great house layout and building orientation; veneer facing patterns; kiva locations; shape of plaza-facing doorways (e.g., T-shaped); decorative finishes on ceilings and walls; treatment of beam shafts; interior kiva floor and wall features.</td>
<td>Methods of wall abutment and core construction; wall foundations; site preparation; choice of wood types for roof and lintel construction; methods of finishing beam ends prefabricating lintel sets; intramural domestic features; intramural kiva offerings.</td>
</tr>
<tr>
<td>Decorated Ceramics</td>
<td>Eccentric vessel forms (e.g., frog and humpback effigies); design elements specifically executed in Chaco B/W style.</td>
<td>Raw material selection (temper, clay, paint); basic construction/forming techniques; paste composition; slip preparation; slip application; design/layout symmetry; presence of Cibola or mixed Cibola and local attributes on Middle San Juan pottery.</td>
</tr>
<tr>
<td>Woven fabrics</td>
<td>Garment styles; fabric color; methods of decorating fabrics; basic design layout.</td>
<td>Warp and weft composition; warp/weft diameters and ratios; selvage composition; selection of spindles and loom parts; design/symmetry/layout.</td>
</tr>
<tr>
<td>Sandals</td>
<td>Sandal form; style of toe- or heel-attachment; presence/absence of toe jog; decorative designs.</td>
<td>Standardization in the preparation of weaving elements; warp/weft ratios; selvage composition; raw materials and sandals in various stages of production; design/symmetry/layout.</td>
</tr>
<tr>
<td>Baskets</td>
<td>Basket form; decorative designs.</td>
<td>Basket foundation; types of splices; stitch density; methods of preparing basketry raw materials.</td>
</tr>
</tbody>
</table>

Table 2. Relationship of high and low visibility attributes to demographic scenarios for the Middle San Juan.

<table>
<thead>
<tr>
<th>Demographic Interpretation</th>
<th>High visibility attributes</th>
<th>Low visibility attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local population, no emulation</td>
<td>Middle San Juan</td>
<td>Middle San Juan</td>
</tr>
<tr>
<td>Local population emulating or exchanging with non-local group</td>
<td>Chacoan</td>
<td>Middle San Juan</td>
</tr>
<tr>
<td>Migration of Chacoan groups</td>
<td>Chacoan</td>
<td>Chacoan</td>
</tr>
</tbody>
</table>
RESEARCH PLAN

Our plan of work involves the following components: 1) fieldwork at three “second-tier” Middle San Juan communities, 2) an architectural study of Aztec Ruins, 3) analysis of existing Aztec and Salmon museum collections (including ceramics, basketry, and textiles), and 4) dissemination of project results via several outlets for scholarly publication and public outreach. We are aware that the study of human remains provides a significant, potential avenue for verifying or disproving the presence of Chacoan migrants in the Middle San Juan region. As noted above, skeletal studies by Akins (1986) and Schillaci (2003) have revealed the presence of at least two populations at Pueblo Bonito. These studies hold some promise for tracking potential Chacoan migrants from Chaco Canyon to Salmon, Aztec, and other Middle San Juan communities. Nevertheless, the study of human remains is not part of our proposal for two reasons. First, very few Chacoan era burials are known from Salmon (n=4) and Aztec (n=4). Beyond the limited burial populations from these two sites, few other Chacoan age human remains have been documented in the region. Thus, we do not believe the sample size is sufficient to warrant a study at this time. Second, human remains under the jurisdiction of the Park Service (i.e., from Aztec) are not currently available for intensive study because of NAGPRA concerns.

Fieldwork at Middle San Juan Pueblo Communities

Planned fieldwork for this research project will specifically address the central research question – what is the nature of Chacoan influence in the Middle San Juan? Do the available data support a model of Chacoan migration? Or, do the patterns identified suggest emulation of Chacoan traits by local groups? Although our primary focus is the two largest communities in the region, Aztec and Salmon pueblos, smaller communities also played a critical role in the development of the region. Thus, we propose detailed site recording, mapping, and midden testing at three site complexes in the area: the Holmes Group, the Flora Vista community, and the Jacquez site. Most of these sites are currently at risk from pot-hunting and commercial development and the data unique to them may not be available in the future. Together, these sites provide good geographic coverage of the Middle San Juan (sites are located in each major drainage in the region—San Juan, Animas, and La Plata) and a temporal cross-section of Puebloan occupation during the Pueblo II-III interval (ca. AD 950-1300). All of these sites have been recorded, mapped, and tested previously (e.g., Dykeman and Langenfeld 1987; McKenna and Toll 2001; Stein and McKenna 1988; Whalley 1980). Our work builds on previous research at these sites and we will make use of prior documentation and maps as we plan and conduct our fieldwork.

A significant recent development for our proposed research is the rediscovery at Eastern New Mexico University of more than 100 boxes of archaeological collections made during the San Juan Valley Archaeological Project survey and testing program in the 1970s. Irwin-Williams and her colleagues developed the project to complement excavations focused on Salmon Ruins and better understand the regional Chacoan phenomenon in the northern Southwest. These collections include a sizeable number of ceramics from the Holmes group and the Jaquez site; the Flora Vista site is not well represented in the collections. The timing of this finding could hardly be better because these collections will allow us to broaden our sample of materials from these sites, and be more selective about our testing program.

Specific research questions that fieldwork will help address include: What evidence, is any, exists to show Chacoan migration to or establishment of these smaller communities? Do these second tier communities show evidence of the Chacoan presence (in architecture, ceramics, lithic, or other material culture) that is also apparent at the first-tier sites of Aztec and Salmon? Do these smaller communities show evidence of a short-lived occupation or do ceramics reveal longer periods of use? If multiple periods of occupation are revealed by architecture or ceramics, can one or more be linked to Chacoan immigrants?

The Holmes group is a large Pueblo II-III (AD 900-1300) complex located on the east side of the La Plata River valley, about 25 kilometers north of Farmington, New Mexico. This ancient community is large and geographically extensive, has two medium-sized great houses, at least one great kiva, a bi-wall structure, and dozens of associated small pueblos spread over more than 100 acres (Dykeman and Langenfeld 1987; Holmes 1878). William Henry Holmes first recorded the site in 1875 for the Hayden Survey (Holmes 1878). Since the time of Holmes, the site has been recorded, mapped, surface-collected, excavated and, unfortunately, pot-hunted numerous times. Despite the impacts, the site is believed to be the most intact of the La Plata Valley great-house complexes. As currently understood, the Holmes group appears to represent a local, La Plata Valley development, with some evidence of Chacoan presence. A recent field visit revealed Chacoan masonry in a pot hunter’s hole in the northern great house. With all the activity at the Holmes Group over the last 125 years, the site has never been systematically studied and no
collections are available. Thus, the extent of Chacoan influence or presence at the community is unknown. Mapping the site and completing detailed in-field architectural and ceramic analysis will provide data to address questions regarding Chacoan migration (e.g., does the northern great house represent direct Chacoan migration to the site)? Further, stratigraphic test units will be excavated in middens at the site to obtain adequate ceramic samples for each period of occupation.

The Flora Vista community consists of a large, Pueblo II-III complex with one great house, multiple room blocks, kivas, and midden areas, as well as a probable great kiva. The community lies on the south side of the Animas River, approximately 7 kilometers west of Aztec Ruins. The site has been partially mapped, surface collected, and tested in prior archaeological work over the last 40 years. The site has also been extensively pot-hunted and is at risk for further destruction because of an encroaching housing development. Based on what has been published about the site, Chacoan influence at the community seems minimal (McKenna and Toll 2001). Thus, the site appears to represent a largely local phenomenon and provides a critical comparison for the study of Chacoan migration of the area, as well as 13th century settlement. Data from the site have never been systematically analyzed or synthesized. The detailed mapping, recording of architecture, excavation of stratigraphic test units, and in-field ceramic analysis will provide data necessary to evaluate questions regarding the local development and/or Chacoan presence.

One large site on the San Juan River will be studied in detail. The Jaquez site is a large (100-room) pueblo (with an associated midden and possible great kiva) located approximately 7 km west of Salmon on the south side of the San Juan River. The site has been recorded and mapped previously but conflicting data about its size and chronology are apparent in the literature (e.g., Davis 1964; McKenna and Toll 2001). Discrete Pueblo II (AD 950-1150) and Pueblo III (AD 1150-1300) occupations have been suggested for Jaquez. Based on some descriptions of the site, it appears to represent a Chacoan outlier with banded masonry and a Chaco ceramic assemblage. Other accounts suggest mostly river cobble construction and later ceramics—together these findings would indicate mostly 13th century occupation. A recent field visit revealed surface ceramics indicating occupation from the late 800s through the late 1200s. Current knowledge of the site is insufficient to understand its place in the Middle San Juan regarding a variety of issues, including Chacoan migration, local development, and 13th century settlement changes. The detailed recording of surface architecture and features, site mapping, and in-field ceramic analysis will provide the data necessary to address these research issues. In addition, several stratigraphic test units will be excavated in middens at the site to obtain adequate ceramic samples for each period of occupation.

An Architectural Study of the Aztec Community

Chacoan great house construction can be viewed as an exceptionally large-scale, complex craft industry that is organized, as with any composite artifact manufacturing process, into several sequential components including raw material acquisition and transport, raw material processing, and assembly. Construction includes technologies that are both additive (e.g., masonry) and subtractive (e.g., roughing out timbers and stones). Because of its scale and complexity, the process of building great houses almost certainly required well-coordinated task groups, probably including both specialized artisans and unspecialized laborers. Unlike any portable artifact class, the process was inconceivable without the cooperation and involvement of large numbers of well-trained personnel. Study of the architecture and construction processes evident at Aztec Ruins will provide critical data for assessing Chacoan presence in the Middle San Juan region.

The National Park Service (NPS) has conducted detailed recording of architectural features at Aztec’s East and West Ruins for the past two decades. This process has been greatly accelerated during the last six years as part of an architectural documentation project at West Ruin (Barthouli 2000; Brown 2001a; Culpepper and Brown 2002). The project includes elaborate and systematic compilation of metric data throughout each room or other structure, scaled photography of architectural details, comprehensive archival research into stabilization histories, and sampling of all wood elements with potential for tree-ring dating or species identification. Currently, much of the data from the West Ruin necessary to address the proposed project’s research issues are available. The primary research goal, to discriminate between Chacoan migration and emulation at Aztec, will be addressed with collected architectural data. Unlike portable artifacts, there is no doubt that most construction tasks were performed on-site, and therefore variability in masonry style, for instance, can be hypothesized to represent variation between individuals and potentially between groups operating within the same social context. Preliminary interpretation of the West Ruin architectural data suggests that the great house was built rapidly by a diverse and perhaps multicultural workforce organized under Chacoan leadership (Brown et al. 2002; Brown 2004).
Primary data collection and database management are currently funded by NPS as part of a major preservation project and the Vanishing Treasures program. This work will continue as Historic Structure Reports are prepared by NPS for Aztec’s East and West Ruins. These preservation-oriented tasks can be incorporated into the architectural study proposed here. Funding from NSF is requested for certain specialized tasks: salary for a temporary Archaeology Technician to assist the Architectural Investigator (Brown) with data entry and field recording on features that are not targeted by the preservation initiative; various special analyses of architectural mortar samples (e.g., archaeobotanical, compositional, geological/soil analysis); and expendable supplies. This is an excellent opportunity to adapt a large database developed for specific NPS management goals toward significant research of interest far beyond the national monument.

The series of specialized analytical studies, as proposed, will provide data on resource acquisition, processing, and raw material source identification. All of these studies bear directly on the core research question posed: Chacoan migration or local emulation? Ethnobotanical and geochemical pilot studies of architectural samples from Aztec West have yielded preliminary data indicating that mortar was made expeditiously from locally available subsurface soils that were mined and mixed during the spring-summer season (Brown 2001b). Tree-ring studies have shown a similar seasonal pattern associated with Chacoan construction at Aztec West, shifting to wood harvesting during the non-agricultural season at Aztec East (Tennessen et al. 2001; Windes and McKenna 2001). Further architectural mortar analyses will include samples from Aztec East, and help to evaluate the potential change from the early to late AD 1100s in seasonal scheduling of construction activities.

Additional data bearing on the organization of construction work have been produced through preliminary studies of architectural mortar samples (Brown 2001b). The proposed analytical studies include sediment particle-size sorting, hydrometer testing, and chemical assays that provide data necessary for distinguishing mortar batches. The ultimate goal of these analyses is identifying individual task groups working within rooms and between floors. If such discrete construction episodes can be specified, significant inferences about how monumental construction projects were organized can be formulated. There is considerable potential for identifying different social groups (e.g., Chacoan versus local work crews). Our desire here is not simply to generalize about where mortar came from and how it was mixed, but also to address refined questions about labor organization and logistics; questions about Chacoan presence and supervision of local workers vs. local emulation of Chacoan patterns.

For comparison, data will be drawn from prior studies of Chaco Canyon’s architecture, particularly Lekson’s (1986) study of great house sites such as Pueblo Bonito, Chetro Ketl, and Pueblo del Arroyo. In addition, the recently completed Chaco Capstone studies have produced databases on architecture and outliers that are available for use (see Lekson 2005). Finally, the Chaco Digital Initiative, directed by Steve Plog of the University of Virginia, has recently made a number of relatively obscure studies of Pueblo Bonito accessible.

In summary, Aztec architectural and construction data will allow for a direct comparison of traits related to Chacoan migration or local emulation in the Middle San Juan. The large number of tree-ring dates from the site allows for a high level of control over the contemporaneity of the architectural units at the site. This, in turn, allows for a controlled comparison of the sequence of construction events, at a decadal-level of precision, from AD 1110-1250. Architectural research will provide data to address the following issues, following the examples and interpretations listed in Tables 1 and 2: 1) identifying differences in construction methods between potential Chacoan migrants (utilizing fine, worked sandstone) and local San Juan builders (who used mostly cobbled and mortar techniques); 2) unlocking the technical and organizational skills necessary to built the Aztec sites (again, contrasting documented Chacoan patterns in Chaco Canyon with local San Juan traits); 3) exploring the use of different sources of architectural materials in the Aztec area as a means of understanding Chacoan techniques, compared with earlier and later San Juan construction methods; 4) and studying patterns of room suite use at Aztec and, secondarily, at Salmon to gain insights regarding Chacoan vs. local San Juan social organization.

Laboratory Analysis of Existing Collections - Ceramic Analysis

Pottery as an abundant artifact class offers a multifaceted analytical tool for addressing research issues relevant to identifying local traditions (e.g., Hays-Gilpin et al. 1999; Hensler 1999; Reed et al. 1998), movements of people (Clark 2001; Lyons 2004), importation of goods (Reed and Hensler 1998; Hays-Gilpin et al. 1999; Kantner et al. 2000; Neitzel and Bishop 1990; Toll 1991; Toll et al. 1992; Van Dyke 1997), and vessel use and attrition (Goff and Hensler 1999; Varien and Potter 1997). Ceramics from the
sites in this study will be an integral part of examining Chacoan presence or influence in the Middle San Juan region through a detailed analysis of technological and stylistic attributes.

Prior ceramic research on a number of Middle San Juan assemblages including Salmon Ruins (Franklin 1980; Wilson 1985), the Box B Site (Mills 1991; Franklin 1991), and a group of 30 regional sites (Whalley 1980) has provided a substantial foundation for ceramic interpretation of the Middle San Juan region. Strict adherence to a traditional (and less than effective) ceramic typology has hindered these studies. Local ceramics in the Middle San Juan region have generally been identified as Northern San Juan (Mesa Verde) tradition (Blinman and Wilson 1989; Breternitz et al. 1974), based on the abundance of crushed rock-tempered pottery and the availability of terrace cobbles of igneous origin along the river drainages. Ceramics classified within the Chaco-Cibola tradition (Toll and McKenna 1987; Windes and McKenna 1989) have been considered trade ware from the southern San Juan Basin, and not thought to be produced locally in the Middle San Juan. The San Juan River has been assumed to be the technological boundary for crushed rock-tempered (to the north) and sand-tempered (to the south) pottery production zones. Sherd-tempered ceramics (which generally include “base” materials like sand or crushed rock are found to the north, south, and within the Middle San Juan but their distributions generally follow those of the sand- and rock-tempered traditions. Sherd temper in this area, then, does not mark a separate tradition.

Ceramic scholar Lori Stephens Reed has been studying ceramics from the Middle San Juan region for the last five years and will conduct the analysis for this project. Reed is currently conducting a limited reanalysis of sherds and whole vessels from Salmon Ruins, analysis of sherds and whole vessels from the Aztec Ruins collections at the AMNH, and analysis of whole vessels and sherds from the Tommy site (a smaller pueblo downstream from Salmon along the San Juan River) and other small sites on the B-Square Ranch on the south side of the San Juan (Reed et al. 2000, 2001). These sites all contain ceramics produced with local clays, with characteristics of both Northern San Juan and Chaco-Cibola traditions. The findings indicate that local ceramic production was complex and rote application of external ceramic typologies does not facilitate understanding at a behavioral level. In contrast, Reed’s (2004) work with large samples from Middle San Juan sites has shown that the ceramics can be segregated into technological and stylistic suites based on paste, temper, slip, paint, and design characteristics (Reed 2004).

Specifically, this work has revealed the existence of discrete ceramic distributions representing several traditions in the decorated assemblages (Reed 2004). Collectively, white ware percentages from these Chaco era sites are as follows: imported Chaco-Cibola (16 %); imported Northern San Juan (10 %); imported Chuska (4 %); local variety of Northern San Juan with crushed rock and sherd (50 %); and local variety of Cibola-Chaco ceramics (19 %). This work, then, has demonstrated a new and reliable methodology for discriminating local from imported ceramics, and provides the foundation for this study.

To evaluate various social processes operating in the Middle San Juan region, Reed will study specific ceramic assemblages using a unique application of Clark’s (2001) and Lyons’s (2003) methodological approach (as detailed in Table 1). Initial ceramic attributes to be examined include those listed in Table 1, for low and high visibility attributes indicative of trait emulation vs. presence of migrant populations. High visibility attributes representing intentional emulation of Chacoan styles by local Middle San Juan potters might include local production of specific effigy vessels unique to Chaco (e.g., hunchback human effigies, frog effigies), painted design elements more commonly associated with Chaco Canyon (e.g., Chaco Black-on-white style) (Toll et al. 1992), and specific design symmetries perhaps unique to Chaco Canyon (Washburn 2004; see Symmetry Analysis below). Not only would these artifacts and attributes be of significance, but as Clark (2001) points out, the execution of unfamiliar design styles, layouts, or symmetries might be visible as errors on a number of levels. If, for example, Chaco Black-on-white vessels are found to employ unique symmetries, comparison of these vessels with locally produced examples will be revealing. Other locally produced artifacts, such as effigy vessels, will be examined and compared with similar artifacts from Chaco Canyon as a means of identifying examples of intentional iconological stylistic emulation.

Low-visibility traits that might be indicative of actual Chacoan migrants comprise a larger set of analysis attributes. Specifically, evidence for migrant potters of the Chaco-Cibola tradition making pottery within the parameters of their learned craft and living in the Middle San Juan region will be sought. Numerous studies have demonstrated the conservative nature of craft production, multigenerational consistency in learning basic techniques of a craft, and the premise that all manufactured artifacts contain evidence of technological styles as residual of their production sequence (e.g., Arnold 1985; Childs 1991; Lechtman 1977; Lemonnier 1986; Sackett 1990; Stark et al. 1998). Identification of Chaco-Cibola tradition
characteristics in the context of local Middle San Juan resources will be undertaken. Three specific technological Chaco-Cibola traits (temper, paint, and slip) will be initially selected for analysis and correlation with local paste characteristic of the Middle San Juan assemblages. The combination of sand or sand and sherd temper, mineral paint, and thinly applied (washy) slip is considered the technological signature of Chaco-Cibola White Ware. Presence of this signature in ceramics with local Middle San Juan pastes (e.g., high silt content and discolored, brownish/yellow appearance) (Reed 2004) will be considered likely evidence for migrant Chaco-Cibola potters. Northern San Juan White Ware produced locally will have crushed rock (augite diorite) or crushed rock and sherd temper, paints including mineral, organic, or a combination of the two, and relatively thick slips. Northern San Juan Gray Ware produced locally will have crushed rock temper (augite diorite). Because socialization of migrant populations will be a consideration, mixing of Chaco-Cibola and Northern San Juan ceramic traits using local resources will be examined.

Analytical techniques planned for the ceramic study include Inductively-Coupled Plasma Emission Spectroscopy (ICP) using the weak acid method (Burton and Simon 1993) for generating tempered clay and ceramic signature data, and petrography to further distinguish local and nonlocal ceramics. A sample of 200 sherds is planned for ICP analysis and 50 sherds for petrographic analysis. Although ICP has been criticized as a less effective elemental analysis technique than Neutron Activation Analysis (NAA), we believe the method is appropriate for identifying ceramic sources in the Middle San Juan area. Reed has employed both techniques on various projects depending on the availability of comparative datasets for specific areas (Reed et al. 2002a, 2002b). Middle San Juan ceramics will be compared with Chaco-Cibola ceramics. These ceramics have a large comparative ICP dataset derived from the Transwestern Project (Mills et al. 1993) and several projects along the northern and central Chuska Valley (Hensler 1999; Reed and Goff 2000; Reed et al. 1998). Reed has worked with the combined ICP dataset, is familiar with the limitations of ICP, and knows the various tests required to control for sensitivities in the method. For example, one of the criticisms offered by Neff et al. (1996) involves sensitivity of ICP to firing temperature and atmosphere differences. It is true that prehistoric firing conditions can affect ICP signatures, but as indicated by Burton and Simon (1996), this sensitivity is not necessarily a failure of the technique. To compensate and control for sensitivity in the ICP method, hardness (using standardized Mohs picks), original paste color (Munsell), andrefired paste color are recorded. Within the Munsell scale, the color value of a ceramic paste reflects the quality of a reductive firing and comparison of hardness values for sherds prior to and after oxidation analysis provides a quantitative means for evaluating relative firing temperatures. Hardness, color, and petrographic data are utilized in discriminant analysis with various projections of the ICP data to support final data clusters interpreted as ceramic group signatures. Finally, NAA (comprising 30 samples) will be used to identify potential source locations for nonlocal Northern San Juan ceramics and to augment the incipient but growing NAA data set for the Four Corners area (Donna Glowacki, personal communication, October 2004).

Cibola ceramics from the Middle San Juan sites will be compared with assemblages from Chaco Canyon (Toll and McKenna 1987, 1992, 1997; Windes 1984) and from sites outside of the canyon (e.g., Franklin 1982; Mills 1988; Mills et al. 1993; Windes 1977). We are aware of only one geochemical studies of ceramics from sites in Chaco Canyon: Neitzel and Bishop's (1990) study of Dogoszhi-style ceramics using NAA. The large ICP dataset we will draw on represents sites outside of Chaco Canyon, but it includes a wide range of types covering a large geographic area.

The ceramic sample will include whole or reconstructible vessels and select sherds from Aztec's East and West Ruins. From Salmon Ruins, a sample of whole-reconstructible vessels and sherds from selected rooms (spread spatially across the pueblo) will be analyzed. Further, a select sample of sherds from the prior San Juan Valley Archaeological Project sites will be analyzed. Data will be entered into an Access database; SPSS and Excel will be used for statistical manipulation and graphics; and digital images will be taken of ceramic designs, paste characteristics, and temper variation.

Ceramic data from the project will be used to address the primary research issue: distinguishing Chacoan migration from local emulation of Chacoan characteristics. Variations in low visibility, technological style will help identify potential migrant potters in the Middle San Juan region. Reed’s prior work at Aztec, Salmon, and the Tommy site has indicated significant variability in technology among local pottery types (as discussed above). Differences in clay and temper resource selection will be used to track potential migrant potters, if they retained their traditional ceramic recipe with local resources compared with local Middle San Juan potters, who utilized different resources and different pottery production recipes. Variations in technological style or use of local resources among the sites in the study will suggest differences in Chaco influence or presence, or in learning frameworks across space or time. Design style
and symmetry variation between local and nonlocal Chaco-Cibola ceramics will provide an opportunity to isolate migrant potters, if present, in the Middle San Juan. Evidence for or against temporal consistency in local Chaco-Cibola technological style after AD 1150 in the Middle San Juan may indicate that descendants of possible migrant potters retained their traditional ceramic technology after the Chacoan era ended in the region.

**Symmetry Analysis of Ceramics**

As a complement to the study of ceramic production in the Middle San Juan, scholar Dorothy Washburn, Ph.D., will undertake a targeted symmetry analysis of whole and partial vessels and large rim sherds. Symmetry analysis systematically describes the structuring of motifs in a design using plane pattern geometries to describe the repetition of these structures (Washburn and Crowe 1988). Previous research has demonstrated that design structures are visual metaphors of a group's cosmologic orientation and social relationships (Washburn 1999, 2004; Sekaquaptewa and Washburn 2004; Washburn and Crowe 2004). The general model hypothesizes that a community whose members share a worldview will create patterns consistently structured by a symmetry that metaphorically describes these institutionalized relationships (Washburn 2002). Conversely, communities utilizing several symmetries, or communities in which the prevailing symmetry is augmented over time by other symmetries, are those composed of several different cultural groups. Symmetry analysis can also be applied to decorations on other material culture such as textiles, sandals, and baskets.

The long standing question of how outliers such as Salmon or Aztec (as well as smaller sites with Chacoan-like architecture) originated (whether through migration or emulation) can be addressed with symmetry analysis. In this case, it is hypothesized that the finding of two distinct symmetry systems might suggest not only that a local population was augmented by groups from Chaco, but also that differences in symmetries are indicative of different cultural orientations and organizations. Conversely, the finding of similar symmetry systems on the Cibola and local San Juan ceramics would support a hypothesis of migration of groups from Chaco with a similar social organization to those already living in the Middle San Juan.

Washburn has already compiled symmetry data on whole vessels from Chacoan sites: Pueblo Bonito, Chetro Ketl, and Pueblo del Arroyo. These existing data provide a comparative Chaco symmetry database for the study. Collections to be sampled for this study will come from Salmon and Aztec West, from new material at Aztec East, from the Tommy site, and from the smaller sites slated for intensive recording and limited testing in the region: Jaquez, Flora Vista, and the Holmes group. Washburn’s sample will first be analyzed typologically by Lori Reed to determine ceramic tradition and source area (as possible). The ability to compile a detailed fingerprint of the nature and extent of the Chacoan presence in the middle San Juan will be important for determining if Chaco populations actually migrated to the area or simply were so dominant or influential that local groups emulated Chacoan characteristics.

**Laboratory Analysis of Existing Collections - Textile and Basketry Analysis**

In contrast to most archaeological projects in the American Southwest, our research on the Middle San Juan offers an exceptional opportunity to incorporate a large database of textiles and basketry into a major regional study of social interaction and migration. More importantly, it offers the chance to compare these perishable data with patterns seen in other material classes, such as architecture and ceramics. Because the production of textiles, baskets, and other perishable objects typically involves a wide range of low-visibility technological steps, perishable artifacts are exceptionally well suited for identifying population movements and social boundaries in the archaeological record (Adovasio 1986; Kent 1957, 1983; McBrinn 2002; Teague 1998; Webster and Loma'omvaya 2004). The variety of low-visibility (isochrestic) technological features found in textiles and basketry (yarn spin, selvage finishes, work direction, and splices, to name just a few) tend to be more temporally and culturally stable than high-visibility (iconological) design attributes found in decorated artifacts, and thus provide a better measure of shared settlement history and common enculturative background than decorative features, which can be widely emulated from afar.

In spite of their high research potential, perishable classes of data are overlooked by most archaeologists because of their uneven distribution in the archaeological record. Such items are rarely recovered from open sites, and the kinds of sites where they do occur (rock shelters and cliff dwellings) are rarely the focus of contemporary archaeological research. Fortunately, the multistoried great houses of Salmon, Aztec, and Chaco Canyon provide a notable exception to this pattern. Here, the sheer
massiveness of the walls and often-intact ceilings resulted in the preservation of diverse assemblages of perishable artifacts, often in surprising quantities. In Chaco Canyon, sizable perishable assemblages were recovered from the great houses of Pueblo Bonito, Chetro Ketl, and Pueblo del Arroyo (Judd 1954, 1959, 1964; Pepper 1920; Vivian et al. 1978), whereas excavations at Salmon Ruins produced over 1000 perishable artifacts (Potter 1981; Webster 2004b). A recent pilot study of the Aztec collection shows it to be even larger and more diverse than Salmon (see also Morris 1919). Representing both Chacoan and post-Chacoan deposits, these assemblages include not only woven cloth, sandals, baskets, pot rests, and matting, but also caches of yucca leaves, reeds, and other raw materials stockpiled for weaving and other manufacturing activities. A preliminary assessment suggests that the production of sandals, baskets, and mats was, in fact, a leading craft specialty at Aztec. A few small sites in the region have also yielded the carbonized remains of textiles, baskets, and mats (e.g., Morris 1939; Webster 1999a, 1999b, 2000), providing a limited data set for comparison.

The importance of these perishable collections cannot be overstated. The well-preserved condition of many of these artifacts offers an opportunity to measure and compare not only technological or isochrestic variability within and between sites, and hence to trace local learning networks and the movements of people, but also iconological patterns and the sharing of ideas, decorative systems, and high-status goods among Chaco and the Middle San Juan. This promises to open an entirely new window into our understanding of Chaco and the Chacoan Outliers.

Perishable research will be conducted by Dr. Laurie Webster, who has already completed a significant amount of research on the Salmon and Aztec collections (Webster 2004a). In 2003 Webster analyzed the fiber perishables from Salmon Ruins, and in June 2004, with funding from the Western National Parks Association, she completed a month-long pilot study of over 800 examples of textiles, basketry, and other worked perishables from Aztec Ruins housed at the American Museum of Natural History (AMNH). Webster’s Salmon research has already documented important technological and stylistic relationships with Chaco Canyon and has shed new light on the ritual use of textiles and baskets at Salmon.

Funding is requested from NSF to complete Webster’s analysis of the Aztec textile and basketry collections and to analyze a sample of the perishable artifacts from Chaco Canyon and Mesa Verde. The Aztec collections are presently distributed among four institutions. The large collection made by Earl Morris in the 1910s-1920s is curated at the American Museum of Natural History (AMNH) in New York and the Western Archeological and Conservation Center (WACC) in Tucson, with some pieces on loan to Aztec Ruins National Monument. A small collection of artifacts from Morris’ excavations is housed at the University of Colorado Museum, Boulder. A fourth collection, the product of various National Park Service mitigation and stabilization projects, is curated at WACC. NSF funding will be used to analyze the remaining Aztec perishable collections, estimated to number about 1000 objects, at the AMNH, WACC, Aztec National Monument, and the University of Colorado, Boulder. To place these Middle San Juan collections in a broader regional context and to interpret social and technological relationships between these regions, collections from Chaco Canyon and Mesa Verde are also included for analysis in the study. The focus of the Chaco analysis will be the textiles and basketry from Pueblo Bonito and Pueblo del Arroyo housed at the AMNH, the National Museum of the American Indian, and the National Museum of Natural History (at the Smithsonian). The Wetherill collections at the Colorado Historical Society will provide a perishables baseline for the Mesa Verde region. A representative sample of 80-100 objects will be selected for analysis from each of these Chaco and Mesa Verde assemblages. Webster will pursue alternative sources of funding for the remainder of the Chaco collections.

Technical analysis of these collections will entail the recording of raw material type, weave structure, construction techniques, element counts, and dimensions for each object, using terminology provided by Emery (1966) and Adovasio (1977). Research photographs and technical drawings will also be generated. Because, as noted above, it is the less visible attributes of artifact manufacture that provide our best indication of learning networks and migration in the archaeological record, particular attention will be paid to hidden attributes of perishable artifact construction, such as selvage finishes, fabric density, and yarn composition for woven fabrics, selvage finishes for mats, and foundation composition and stitch splices for baskets. Iconological or decorative features, including coloration, basket form, and design symmetry (Washburn and Crowe 1988) will also be recorded. Following analysis, the data will be entered into an Access database, and the perishable patterns identified for the Middle San Juan will be compared with those from Chaco Canyon and Mesa Verde to address broader issues of migration and shifting regional relationships.

Perishable data will be used to address several explicit research questions. Variations in technological
style will help us discriminate between the work of Chacoan and local Middle San Juan weavers and basketmakers and to better understand the social dynamics, residential patterns, and learning networks of the people living at Salmon and Aztec. We are particularly interested to learn if 12th- and 13th-century perishables from Salmon and Aztec exhibit continuity with earlier Chaco-period traditions and whether the post-A.D. 1130 perishables from Salmon and Aztec reflect an expansion of social ties with communities outside the Middle San Juan. Webster’s Salmon study indicates strong continuities between Chacoan and post-Chacoan perishables in certain mortuary settings, and the post-Chacoan period seems to be characterized by a growing conformity in basketry design and technology between Salmon, Aztec, and Mesa Verde. Perishable data relating to ritual and craft specialization will also be used to test the hypothesis that Aztec emerged as a political, economic, and ceremonial center following the decline of the Chaco regional system. As noted above, stockpiles of bundled yucca and other plant materials were discovered by Earl Morris at Aztec, suggesting that this site may have served as an important center for the production of basketry, sandals, and matting. We believe that this perishable study has the potential to elucidate social and economic patterns not reflected in other material classes.

ORGANIZATION OF THE RESEARCH TEAM

Utilizing the best team to investigate the core research issues for the project is critical to our success. To do so, we have brought together a team with more than a century of combined research experience with the specialized knowledge of the Middle San Juan region essential to understanding its complexities. Paul F. Reed, current director of the Salmon Ruins Research Initiative for the Center for Desert Archaeology and former project director with the Navajo Nation Archaeology Department in Farmington, New Mexico, is the Principal Investigator (PI) and will oversee the project and direct the field research. Laurie Webster will serve as Co-PI and conduct the perishable studies. Jeffery Clark will serve as senior project advisor and Co-PI for migration studies. Webster and ceramics scholar Lori Stephens Reed will conduct the textile, basketry, and ceramic analysis for the project and oversee the research on craft production. They have already studied the perishables and ceramics from Salmon Ruins and undertaken a pilot study of the Aztec collections. Dorothy Washburn will conduct a focused ceramic symmetry analysis, coordinating with Lori Reed to produce complementary data on whole vessels and large sherds. Gary M. Brown, archaeologist at Aztec Ruins National Monument, has been involved with the recent architectural study of the West Ruin at Aztec, and will direct the Aztec architectural study for the project and consult on site interpretation. All of Brown’s time is funded by the Aztec Ruins and the NPS, through the partnership developed for this project.

In summary, the Research Team consists of: Senior Research: Paul F. Reed (settlement, community organization, Salmon, Middle San Juan); Laurie Webster (textile/perishable analysis, sociocultural identity); Jeffery Clark (migration, demography, social organization). Analytical Specialists: Lori Stephens Reed (ceramic analysis, Middle San Juan, exchange); Gary Brown (architectural analysis, Aztec Ruins, community organization); Dorothy Washburn (ceramics, symmetry studies). Technical Consultants: James Burton (ICP analyses); Andrea Carpenter (petrography); Jeff Speakman (NAA analysis).

Finally, we consider a panel of knowledgeable, outside researchers critical to the success of this project. The panel will be convened twice yearly to discuss the project and to review papers, reports, and materials produced as a result of the grant. Our advisory panel includes: Karen Adams (ethnobotany, Northern San Juan, Salmon Ruins paleobotany), H. Wolcott Toll (ceramics, La Plata Valley, social organization); Linda Wheelbarger (San Juan River, settlement systems); Richard Wilshusen (Northern San Juan, demography, migration); Thomas Windes (dendrochronology, Chaco, labor organization); Ruth Van Dyke (Chacoan Outliers, ritual, sociopolitical organization); and R. Gwinn Vivian (Chaco, social organization, agricultural systems).

DISSEMINATION OF PROJECT FINDINGS

Timely dissemination of the project results is critical to fulfilling our goals. Databases generated during the project will be made available, upon request, to professional researchers. All artifact data generated by this project will be available on-line at the Center’s website. For the professional community, several publication outlets will be pursued: 1) A conference including project participants and independent scholars, culminating in an edited publication; 2) Presentations at national meetings including the Society for American Archaeology and the American Anthropological Association; and 3) Articles in professional journals such as American Antiquity, Journal of Archaeological Research, and Kiva.
Several means will be employed for public outreach: 1) a dedicated issue of *Archaeology Southwest*, the Center’s quarterly publication; 2) public lectures for the San Juan Archaeological Society and the Salmon Ruins Museum lecture series; 3) presentations of the project’s results to Native American groups; 4) development of a plan for a traveling museum exhibit that highlights the findings of the project. Because of its importance to the overall project, we discuss the later objective more fully here.

Addressing the primary research issues in our proposal will have wide public impact. Aztec and Salmon ruins have a combined annual attendance of more than 65,000 visitors. Yet, the majority of their exhibits and interpretation have not been significantly revised for decades. The soon-to-be published results of the recent NPS Chaco Synthesis Project (Lekson 2005) in combination with the forthcoming Salmon report (Reed 2005), and the proposed work on Aztec and surrounding sites will significantly alter our understandings of the rise of the Chaco system, its florescence and demise, and the reorganization of this system at Aztec. This is a story that deserves not only an academic telling, but a public venue as well. The Center for Desert Archaeology, Salmon Ruins Museum, and Aztec Ruins National Monument have been engaged in local and regional public education about the Southwestern past for over two decades. The present proposed project is an outgrowth of a four-year project to properly curate the 1.5 million artifacts and samples from Cynthia Irwin-Williams’s massive project at Salmon Ruins in the 1970s and to finally publish a comprehensive report on this project (see Reed 2002). Few visitors at this time recognize the many similarities of the post-Chaco Aztec Community complex to the better-known Pueblo Bonito-Chetro Keti complex in Chaco Canyon. A vital part of the proposed research project involves laying the foundation for fundamentally reinterpreting the Aztec and Salmon site complexes for the public and making the beginnings of the modern Pueblos better understood.

As a final part of completing the project, we will apply for an NSF Communicating Research to Public Audiences (CRPA) grant, in cooperation with the Aztec Ruins National Monument and San Juan County Museum Association (which governs Salmon Ruins), for upgrading the interpretive material at both sites. Aztec has recently begun the process of upgrading its exhibits and interpretive program. Team members will work with both groups to produce a planning document to redevelop the public presentation of the post-Chaco Puebloan world at both locales. It is likely that a traveling exhibit would be the most cost-effective and successful means of making the new information available.

Because of their high visibility and decorated pottery, Chaco-era Puebloan sites are easy to find and often subject to looting. Several of the sites (particularly, the Flora Vista complex) to be studied are privately held, have been damaged by non-professional excavation, and are threatened by development and looting. The systematic recording and mapping of these sites are an initial step in this direction, as well as providing critical information in the event that the sites suffer further damage. Data collected during the project will be shared with state and national preservation organizations to encourage and facilitate their efforts. The Archaeological Conservancy has contacted several of the landowners involved and the Center has and will continue to assist in this process. Lastly, preliminary discussions are underway with the New Mexico Historic Preservation Division regarding other preservation options for these sites.

**SUMMARY**

How did the Aztec and Salmon communities emerge in the waning years of the Chacoan system in the northern Southwest? Do the data available support Chacoan migration of the Middle San Juan region? If so, what attracted Chacoans to the Middle San Juan region? Or, is the unique material culture and architecture of the Middle San Juan region in the 12th and 13th centuries the result of exchange and emulation of Chacoan patterns? How did Chacoan influence mesh with the prevailing pattern of life in the Middle San Juan? These questions have been the subject of inquiry for nearly 100 years. Earl Morris worked at Aztec Ruins in the early part of the 20th century, recognizing its importance for understanding Puebloan history of the greater San Juan region, particularly Chaco Canyon. The work of Cynthia Irwin-Williams and her colleagues in the 1970s began to address the nature of Chacoan presence or influence at Salmon Ruins, and provided preliminary answers to these questions. But, the work of these archaeological pioneers only scratched the surface of these complex issues.

Current studies by researchers affiliated with the Center for Desert Archaeology and Aztec Ruins National Monument have begun the research process outlined in this project. This research indicates Chacoan influence in architecture, perishables, and ceramics in the late 11th century, with initial construction and settlement at Salmon Pueblo, and later settlement of a larger group at great houses constructed in the Aztec Community. Beyond these largest sites in the region, a number of “second-tier” communities exhibit evidence of Chacoan influence including Jaquez, Flora Vista, and the Holmes Group...
(along with other locales not proposed for study). Our work will provide for a better understanding of these smaller communities and their relationship, if any, to the larger Chacoan “system.”

To summarize the main components of this project, archaeological studies already underway include:

- the Center's Salmon Research Initiative including settlement, ceramic, perishable, and architecture studies, synthesis, and publication
- Aztec Ruins (West Ruin) architectural study
- WNPA-sponsored research into textile and ceramic craft industries at Aztec Ruins

Funding requested from NSF for this project will support:

- the Center's proposed fieldwork at three Middle San Juan Puebloan communities
- the focused Aztec architectural study at the East Ruins
- ceramic and perishable research on collections from Aztec, Salmon Pueblo, and Chaco Canyon
- synthetic research and publication efforts.

Upon award, we will seek NSF CRPA funds to develop and implement a traveling museum exhibit. The project will not only bring new methods and data to bear on old (and new) questions, but will also bring the results of this research to a much larger audience than previously reached.