

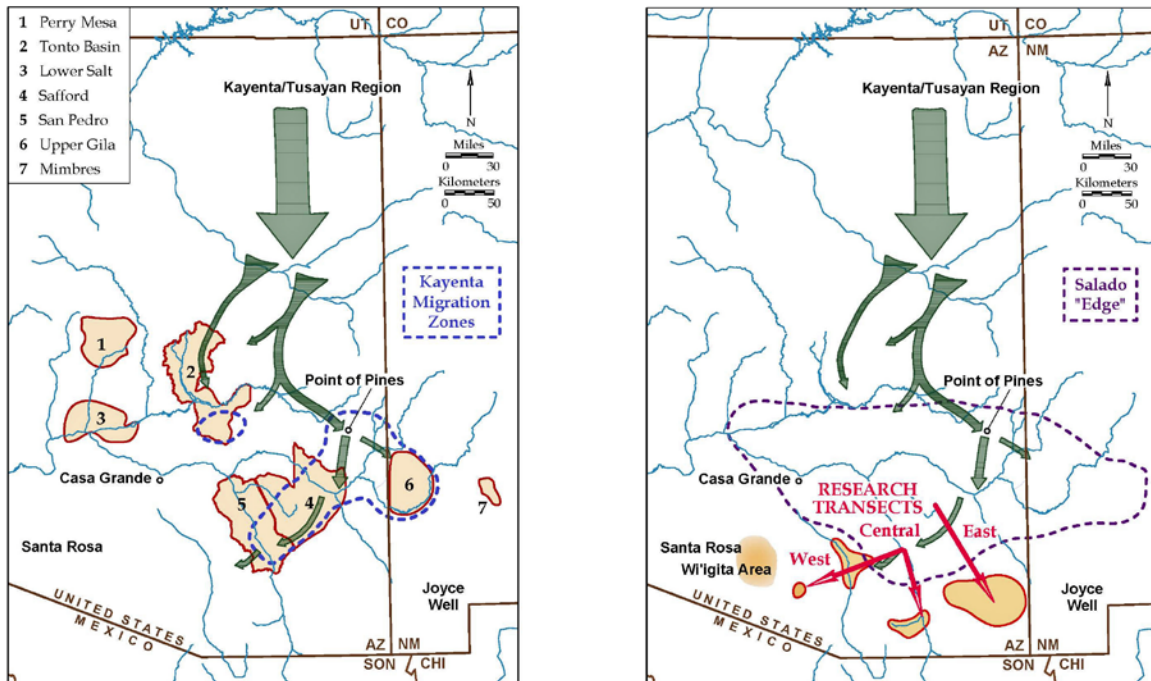
Proposal Submitted to NSF Archaeology Program by:

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Proposal Title: **CULTURAL PERSISTENCE AND RESISTANCE AT THE EDGE OF SALADO**

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CULTURAL PERSISTENCE AND RESISTANCE AT THE EDGE OF SALADO

What slows or halts the spread of a popular ideology? Previous Center for Desert Archaeology (CDA) research has focused on detecting and assessing the impact of Kayenta migration from the northern to the southern U.S. Southwest in the late pre-contact period (Figure 1a). This research has demonstrated that Kayenta immigrants were a minority with a strong identity that substantially impacted southern populations. Although dispersed in exile, the Kayenta and their descendants maintained extensive exchange and communication networks. Ultimately, Kayenta descendants developed an inclusive ideology that was embraced by many local groups. Archaeologists have labeled this ideology and associated hybrid identity “Salado” (Haury 1945; Crown 1994). Yet there were limits to the spread of this ideology and cultural hybridization. The presence of an archaeologically visible “Salado edge” zone across southern Arizona leads us to our central research question: What halts the spread of an ideology?

We propose to examine local groups at the limits of Kayenta migration and Salado hybridization. Preliminary evidence suggests considerable variability in the acceptance of Kayenta migrants and adoption of Salado ideology along this edge zone. Our goal is to identify places where exposure to Kayenta immigration and Salado influence is restricted in this zone. That will allow us to explore the level of resistance to this foreign ideology and the persistence of local traditions. It also raises the question: Were such areas inhabited by conservative groups who actively resisted foreign influence or were they merely regions beyond the reach of Kayenta immigrants and hence not exposed to Salado ideology? Answering this fundamental question will provide insight into why some groups did not participate in one of the largest ideological movements in the ancient Southwest.

More than a decade of CDA research has focused on assessing the disproportionately high impact of relative small Kayenta groups (Hill et al. 2004; Clark and Lyons 2011). The Kayenta and other ancestral Puebloan groups with whom they intermingled made up no more than 20 percent of the population in the southern Southwest (Hill et al. 2004). The relative size of groups in cultural contact situations is an important variable to consider (Duff 2002). However, as European colonization and the Jewish Diaspora demonstrate, other variables are also important, including technology, ideology, and identity. Our research demonstrates that the Kayenta had a powerful ideology and maintained a cohesive identity in exile that compensated for their numerical minority.

Local groups were not passive recipients of Kayenta culture and religion. They possessed traditions that had developed over more than a millennium in the context of stable irrigation communities. In this project we propose to give voice to these silent majorities. We focus on those along the southern edge of the Salado who continued to practice traditions that appear anachronistic following the dramatic changes occurring elsewhere in the southern Southwest during the late 13th and early 14th centuries.

We will examine exposure/resistance to Salado and the persistence of local traditions along three research transects that traverse the southern Salado edge along different axes (Figure 1b): 1) an east transect through the Sulphur Springs Valley and Chiricahua Mountains, 2) a central transect along the southern San Pedro Valley, and 3) a west transect through the Tucson Basin into the Papaguería. Based on limited current data, we hypothesize that as we move south and west along these transects we will find more resistance and/or less exposure to Salado ideology. However, areas traversed by each transect are culturally or environmentally heterogeneous and must be considered separately. We will explore this variability using existing museum collections and samples obtained from limited excavation, as well as relevant environmental and demographic data. Our research program also includes collaboration with the Tohono O’odham on relevant traditions, field visits to archaeological sites, and ethnohistoric data from early Spanish documents. All data will be integrated in a GIS.

Below we summarize previous NSF-funded CDA research, which sets the stage for the proposed project. A theoretical discussion of the persistence of traditions and resistance to foreign influence using colonial and post-colonial case studies follows. Middle range inferences are used to bridge theory and analyses. The three research transects, collection methods, and planned analyses are then discussed in detail. We conclude with the broader impacts of our research program.

PREVIOUS NSF WORK SETS THE STAGE

This project builds upon more than a decade of CDA research on migration and the Salado phenomenon, including four NSF-funded projects, as well as previous studies (Crown 1994; Haury 1945; 1958). This research has gained wide acceptance within the archaeological community (e.g., Bernardini 2005; Fowler 2007; Mills 2011; Ortman 2010). Other explanations for population aggregation and decline

during the late pre-contact period in the southern Southwest de-emphasize the impact of Kayenta migration and favor internal processes (e.g., Wood 2000) or environmental causes such as those based on stream flow reconstructions (Graybill et al. 2006). While internal processes, including community development and aggregation, and environmental factors such as floods and droughts were important, we also believe that external social and demographic processes such as migration played critical roles in the dramatic changes that occurred in the region in the late 13th and early 14th centuries A.D.

The research summarized below provides compelling support for our model that allows us to move on to the next stage. These results mesh well with multi-variate explanations that include ecological and internal factors. For comprehensive discussions of the supporting data the reader is referred to Clark 2001; 2007; Clark and Lyons 2011; Hill et al. 2004; and Neuzil 2008.

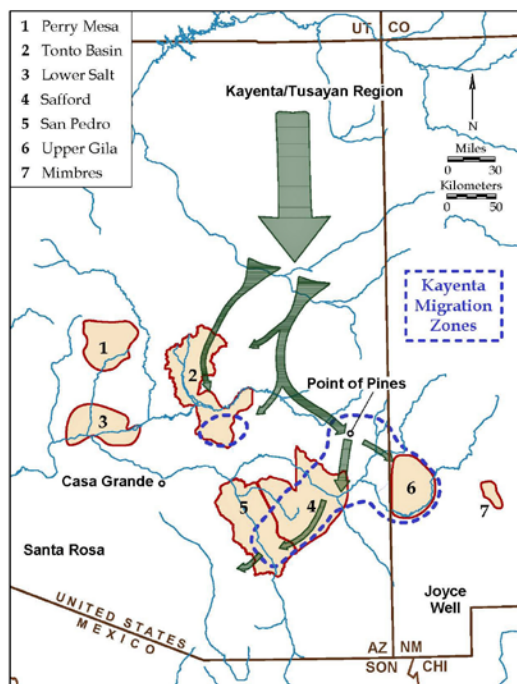


Figure 1a. Kayenta migration routes and the zones where they settled in relation to CDA's previous NSF-supported research areas.

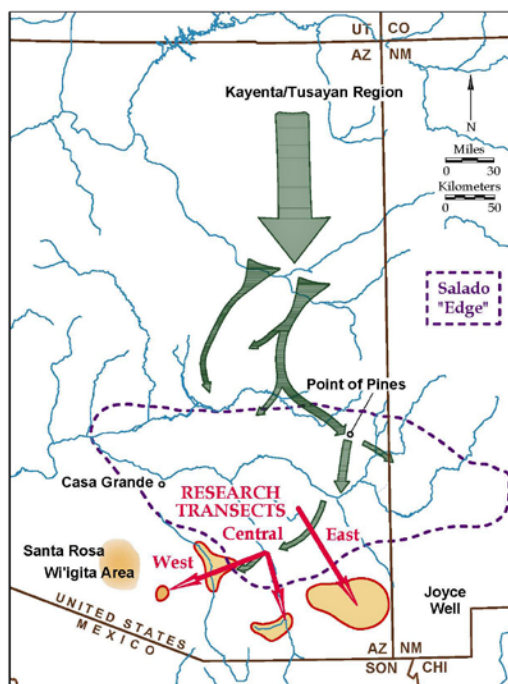


Figure 1b. Dashed line indicates the Salado core area. Three research transects cross this line to sample inferred resistance zones.

Lower San Pedro Valley Testing and Petrography (NSF Award 9903332)

In a privately funded project, CDA tested trash deposits at 29 sites in the northern San Pedro Valley from 1999 to 2001 (see Figure 1a). The goal of this fieldwork was to obtain a representative sample of artifacts, and plant and animal remains from every major late pre-contact settlement in this region. In conjunction with this project, a detailed petrographic model for ceramic temper sourcing was developed for the entire San Pedro Valley (NSF Award 9903332).

Based on the project results and previous research (Tuthill 1947; Di Peso 1958; Franklin 1980) the northern San Pedro was divided into four districts (Clark and Lyons 2011). Enculturative markers (Clark 2001; 2004; 2007) unique to Kayenta groups such as perforated plates (Lyons and Lindsay 2006) and entry boxes (Lindsay et al. 1968), as well as kivas (Di Peso 1958), showed that immigrant families from northeast Arizona established several enclaves in the southern-most archaeological district during the late 13th and early 14th centuries. Differences in local and immigrant paleobotanical assemblages and construction materials were also noted (Clark and Lyons 2011).

Initially, Kayenta immigrants competed and perhaps clashed with local groups in the northern districts (Wallace and Doelle 2001). Shortly after the arrival of the first Kayenta immigrants, local groups aggregated into walled villages and constructed platform mounds, perhaps as territorial markers. Immigrants made Maverick Mountain Series pottery, replicating ceramic technologies and styles from the homeland using local raw materials (Lyons 2003). In response, local groups revived their decorated

ceramic tradition, producing San Carlos Red-on-brown. Elevated tension at district boundaries is shown by the development of buffer zones and fortified settlements in defensible locations.

Tensions eased after a generation or two of coresidence within the valley. By the mid-14th century, Salado polychromes dominated decorated ceramic assemblages of both local and immigrant settlements, replacing the socially divisive ceramic traditions of the previous period. Petrographic analysis indicates that the vast majority of Salado polychromes were produced at Kayenta enclaves (Lyons 2011). Pollen analysis conducted at one enclave revealed high concentrations of the Rocky Mountain bee plant that, among other uses (Adams et al. 2002), is an ingredient in organic black paints such as those on Salado polychrome vessels (Lyons et al. in prep). This plant is not native to the Sonoran Desert and must have been imported from regions to the north (Dunmire and Tierney 1995 1997; Fish 1995; 1998; 2004).

In conjunction with the widespread use of Salado polychromes, obsidian frequency increased dramatically during the 14th century (Hill et al. 2004; Clark and Lyons. 2011). X-ray fluorescence (XRF) sourcing indicates that most obsidian came from Upper Gila sources, with the majority from Mule Creek in southwest New Mexico (see Figure 1a). Kayenta enclaves had substantially more obsidian than local settlements and only used Upper Gila sources. This suggests that immigrants had better access to these sources despite the fact that local groups were closer to them. Greater access by immigrants and the discovery of a Kayenta enclave near the Mule Creek source (discussed below) suggest the emergence of a post-migration Kayenta social network that circulated this exotic and potential valuable raw material. Control of both decorated ceramic production and obsidian exchange attest to the power of the Kayenta minority and their descendants.

A refined seriation of Salado polychromes (Lyons 2004) enhanced chronological resolution for the late pre-contact period. This seriation and the presence of a few northern intrusive wares such as Rio Grande Glaze Ware, Matsaki Buff Ware, and Jeddito Yellow Ware allowed us to identify a gradual decline in population and contraction of settlement north toward the Gila River during the 14th and early 15th centuries. Although ceremonial architecture is not apparent, these settlements have high densities of Salado polychromes. These include large serving vessels with exterior designs presumably used in feasts, attesting their ideological value (Crown 1994; Clark and Lyons 2011; Mills 2007). The last substantial settlements display a mixture of local and immigrant material culture, which we interpret as evidence for population mixing and cultural hybridization at the end of the pre-contact sequence.

Salado Coalescence and Population Decline in Southern Arizona (NSF Award 342661)

Using the northern San Pedro case study as an interpretative baseline and employing a comparable analytic strategy, we explored the relationship between migration, coalescence and decline in the southern Southwest at a broader scale. The scope of research was expanded to include four additional study areas: Tonto Basin, Safford Basin, Perry Mesa, and the lower Salt Valley in the Phoenix Basin (see Figure 1a; Clark 2007; Clark et al. 2011; Hill et al. 2004; Lyons et al. 2008; Neuzil 2008). Sherds from over 1400 vessels, primarily Salado polychromes, were petrographically sourced to reconstruct ceramic production and exchange patterns. In addition, 1200 obsidian samples were sourced by XRF in order to reconstruct the network that circulated this raw material at a macro-regional scale. Our results verified earlier research (Haury 1945; 1958) that a migration stream dominated by Kayenta, but including other peoples, reached the Little Colorado River and branched out to the south in the late 13th century (see Figure 1). One branch continued to Point of Pines and then fanned out to the Globe Highlands, Upper Gila, and Safford Basin. Groups passing through the latter ultimately reached the San Pedro Valley.

As in the northern San Pedro, Kayenta enclaves were associated with Maverick Mountain Series pottery, perforated plates, Upper Gila obsidian, entry boxes and kivas. Petrographic studies (Clark 2007; Lyons 2011; Lyons and Lindsay 2006; Neuzil 2008) showed that Kayenta enclaves were closely linked with 14th century Salado polychrome production in all but the Perry Mesa study area. This suggests that immigrant descendants played an important role in the widespread distribution of this ideologically “charged” pottery (Crown 1994:90; Nelson and LeBlanc 1986:1-14). Not a single Salado polychrome production area has been clearly associated with local settlements.

Coincident with the appearance of Salado polychromes, the obsidian exchange increased substantially in all study areas (Shackley 2005). XRF sourcing revealed macro-regional networks organized by Kayenta groups that circulated Mule Creek obsidian throughout southeast and central Arizona. This pattern that does not conform to distance-decay model expectations of nearest source use and clinal distributions (Clark 2007; Clark and Lyons 2011; Neuzil 2008).

Our results suggest that Kayenta immigration into southeastern Arizona and subsequent social tensions played an important role in the unprecedented level of aggregation during the late pre-contact period. While this aggregation may have satisfied short-term security concerns, it ultimately proved to be non-sustainable because of local environmental degradation and declining health conditions (Clark 2007; Lyons et al. 2011) that were exacerbated by intervals of drought or highly variable rainfall (Graybill et al. 2006). Coalescence continued despite these problems with populations caught in a rigid cycle of aggregation and re-aggregation into increasingly confined territories (Hegmon et al. 2008). The final communities were comprised of remnant populations from multiple cultural backgrounds. These populations attempted to bridge cultural differences and maintain viable irrigation communities by developing an integrative ideology expressed on Salado polychromes. Ultimately, these late villages failed as part of a larger demographic decline in the southern Southwest (Hill et al. 2004).

The Kayenta Diaspora in Southwest New Mexico (NSF Award 819657)

Our previous research emphasized the impact of Kayenta immigration on local groups in southern Arizona and the formation of multi-cultural coalescent communities integrated by an inclusive Salado ideology expressed on polychrome pottery (see also Crown 1994). Petrographic analysis closely tied the production of Salado polychromes to the Kayenta minority and their descendants; a dispersed and displaced minority living in areas occupied by much larger local populations. Despite multiple Salado polychrome production areas, widespread homogeneity in style and technology points to connections that transcend local coalescent communities. This homogeneity and the initial control of decorated ceramic production by Kayenta-affiliated groups argue for the development of a social network that linked these dispersed immigrants after resettlement. Further evidence for this network is provided by the distribution pattern of Mule Creek obsidian.

We proposed that this network was a diasporic community maintained by Kayenta immigrants and their descendants for at least a century after they left their homeland. Diasporic communities connect groups scattered by migration based on a real or imagined shared cultural heritage (Andersen 2006; Boyarin and Boyarin 1993; Clifford 1994). As such they represent both competing and complementary organizations to coalescent communities where the challenge is to integrate culturally diverse populations sharing a place. We proposed both types of communities formed in response to the demographic upheaval that took place across the Southwest during the late 13th century.

Shifting our focus away from southern Arizona, we examined 14th century community organization and cultural identity along the Upper Gila tributaries and in the Mimbres Valley of southwest New Mexico. Mule Creek and Cliff Valley were emphasized; the former because of its proximity to the obsidian source and the latter because it was densely populated during the late pre-contact period. In both areas, Kayenta enclaves were identified by perforated plates and Maverick Mountain Series ceramics.

Contrary to our initial expectations and the extant literature (Lekson 2002), Kayenta immigrants did not enter an empty niche depopulated after the Classic period Mimbres reorganization. Instead they encountered substantial, but dispersed, local communities that have only been recently recognized by archaeologists (Dungan et al. 2010; Hegmon et al. 1999; Nelson 1999; Nelson et al. 2007). As in southern Arizona, relations with these groups varied, but ultimately Salado polychromes and the socially contagious ideology associated with these ceramics prevailed here as well.

At Mule Creek, Kayenta groups moved into the largest local settlement in the region. This Kayenta enclave and the Salado village that developed around it was a likely supplier of Mule Creek obsidian in the Kayenta-mediated network that had previously only been identified from consumer settlements in southeastern Arizona. As expected, obsidian use in this village increased through time, exceeding 50 percent of the flaked stone assemblage by the end of the occupation (Huntley et al. 2010). Our research also suggests that small groups from failing Salado coalescent communities in southeastern Arizona joined Salado communities in southwestern New Mexico during the late 14th century. During this interval we see the dissolution of the Kayenta diasporic community as population substantially declined in valleys and basins throughout southern Arizona. At this late interval, the homogeneous Salado polychrome horizon was replaced by a number of regional variants (Neuzil and Lyons 2006). In southwestern New Mexico these variants reflect the revival of local traditions, including vessels with smudged interiors (Dinwiddie Polychrome) and those with white exterior designs (e.g., Cliff White-on-red) reminiscent of St. Johns Polychrome and McDonald Painted Corrugated. Salado communities in southwestern New Mexico were abandoned by the early 15th century with several groups probably emigrating north to Zuni.

Reconstructing Social Networks in the Western U.S. Southwest (NSF Award 827011)

In collaboration with the University of Arizona, CDA has embarked on an ambitious project to construct a material culture database (the Southwest Social Networks or SWSN database) that includes all investigated major settlements between A.D. 1200 and 1600 in Arizona and New Mexico west of the Continental Divide (Mills and Clark 2008; Mills et al. 2010; Clark et al. 2010). A primary goal is to characterize the structure and dynamics of social networks during this period of demographic upheaval and decline, applying methods and models from quantitative sociology and physics. This is the first application of social network theory and methods to a large regional archaeological database that measures network dynamics over centuries. To date, social network analysis has largely concentrated on contemporary examples such as the internet and citation networks.

We have added the material culture “edges” to approximately 1700 site “nodes” in the Coalescent Communities Database or CCD (Hill et al. 2004; Wilcox et al. 2003), a database created by CDA and shared with Southwest archaeologists to examine demographic trends in the late pre-contact period (e.g., Ingram 2008). The SWSN database includes ceramic ware and type frequency for over 2 million ceramics, from more than 500 sites. We have also either analyzed or compiled obsidian source data for over 3,000 artifacts from nearly 100 sites. Ceramic apportioning of multi-component site assemblages allows us to reconstruct “snapshots” of social networks at 50-year intervals from A.D. 1200 to 1500.

Preliminary macro-regional decorated ceramic and obsidian source distributions verify the Kayenta-dominated migration stream presented in Figure 1. This stream first appears as a tight distribution of Maverick Mountain Series ceramics near migration routes, followed by a considerably broader network of Salado polychrome dominated sites that suggest both the emergence of a Kayenta diasporic network and close interaction with local groups (see Figure 1b). Our research also identifies an increase of an order of magnitude in exotic obsidian use in the southern Southwest around A.D. 1300. At least five obsidian procurement and exchange spheres can be defined, including the Mule Creek sphere that correlates with the both the location of Kayenta enclaves and the densest distribution of Salado polychromes. Some of these obsidian exchange spheres follow distance decay predictions while others do not, indicating that social factors are at work.

From Kayentaphile to Saladophobe

The research summarized above highlights the impact of Kayenta immigration during the late pre-contact period. We have focused on local groups who interacted closely with these immigrants in coalescent communities where cultural hybridization occurred and an inclusive Salado ideology developed. This impact has also been examined from the perspective of relations among spatially dispersed Kayenta enclaves, who for several generations maintained a diasporic network along which powerful ideas and valuable goods flowed. Our emphasis on the Kayenta has left out important segments of the population in the southern Southwest. Some local groups were minimally impacted by Kayenta immigration because of lack of exposure or active resistance to this foreign influence.

THEORETICAL FRAMEWORK: CULTURAL PERSISTENCE AND RESISTANCE TO THE “OTHER”

Anthropological literature on culture persistence and resistance to foreign ideologies is extensive and a thorough review is beyond the scope of this proposal. This literature is related to the much larger research domain of cultural contact and interaction across cultural boundaries (e.g., Cusick 1998). Here we focus (not exclusively) on resistance to external influence by traditional and indigenous groups in marginal and isolated settings. This isolation distinguishes the research transects at the southern edge of the Salado from our previous study areas in the primary river valleys with relatively dense populations.

We hypothesize that marginal or isolated groups tend to be conservative and intolerant of immigrants and their ideas. In these contexts, socially distant groups are viewed with suspicion and fear. In addition, marginal groups may have less exposure to foreign peoples and their ideas. Demographic and cultural boundaries in these areas should be restrictive as opposed to the porous or fluid boundaries associated with hybridity (Parker 2006). European colonial and post-colonial case studies provide a diverse array of examples of cultural resistance and persistence. Although many of these case studies are derived from state societies, we believe that aspects are relevant to traditional societies if they are appropriately scaled down and qualitative differences carefully considered. As Cobb (2005:571-572) aptly states: “If archaeology is to avoid being perceived as the heir apparent of the savage slot vacated by sociocultural

anthropology, the larger discipline of anthropology faces a somewhat daunting task of accommodating differences not readily reconcilable. ... Yet the importance of attempting to bridge such differences cannot be overstated. Is it possible to accept the notion that certain global processes may share some similarities that should not be simply disregarded, even if the root causes differ? These provide the basis for useful characterizations that are not necessarily caricaturizations, which in turn hold out the hope that comparative research by historical anthropologists of all stripes still has a useful role to play within the realm of anthropological analysis.”

We aspire to bridge these apparent differences and avoid the “savage slot” by finding useful analogies in colonial and post-colonial studies. In this framework, we view European colonists as socially distant immigrant minorities with more developed technologies, more complex social organizations, and more virulent diseases than the indigenous majorities they encountered, resulting in highly asymmetrical culture contact contexts. Compared to European immigrants, Kayenta groups who immigrated over 300 kilometers were less socially distant with respect to local groups, but still substantially distant considering that pedestrian travel was the only mode of transportation. Also Kayenta groups did not possess the technological or organizational power to politically dominate locals or to forcibly convert them to their ideology. Ideological conversion could only have occurred if local groups accrued real or perceived benefits. Evidence indicates that the Kayenta possessed a strong identity that was transformed into the socially contagious Salado ideology over the course of a generation or two. This ideology and the material culture associated with it were attractive to many local groups (Clark and Lyons 2011; Clark et al. 2011; Crown 1994). However, some local groups did not embrace this new ideology.

A survey of case studies focusing on relations between indigenous societies and “foreign” groups shows that resistance is highly variable and context-dependent. In decreasing order of severity, resistance can range from violent revolts (e.g., Brown 1991:392-394; Wilcox 2009) to ideological movements (e.g., Brown 1991:394-396; Canessa 2000; MacIntosh 2004) to passive resistance and mere cultural survival in the face of assimilative pressures by more powerful groups (e.g., Deagan 2004; de Vidas 2002; Radding 1997; Shah 2007). Our literature survey below indicates that ideological resistance and cultural survival are more common than violence, especially at archaeological time scales.

Violent Resistance

Violence is the most extreme form of cultural resistance, but often the most transitory from a deep time perspective. Here the Pueblo Revolt from 1680 to 1692 at the northern frontier of New Spain provides an ideal example. Violent conflict is indicated by dramatic shifts in settlement location to ridge tops and other defensible locations (Wilcox 2009:176-208). Settlement organization also radically changed from planned villages to ad hoc arrangements of structures reflecting the rapid coalescence of groups from different pre-revolt communities (Ferguson 1996; Wilcox 2009:230-231). Violence accompanied other forms of resistance to Spanish missionization, including post-revolt revitalization movements reflected in pottery and other material culture. For example, historic Matsaki Buff Ware pottery bears katsina images that are less recognizable and less visible to casual observers than pre-contact images – a deliberate strategy used by Zuni potters to obscure “subversive” traditional religious images (Mills 2002). Immediately after the revolt, dramatic shifts in ceramic technology by female potters at Zuni reflect the emergence of new shared identities (Mills 2002). Similarly, the reuse of ancient motifs on post-revolt Rio Grande Glaze Ware made at the pueblo of Kotyiti is viewed as one aspect of a revitalization movement that hearkened to “traditional” values and identities (Capone and Preucel 2002). Spielmann and colleagues (2006) identify changes in the decoration of 17th pottery that reflect different types of resistance to missionization at the Salinas pueblos. While religiously charged images on glaze ware bowls were deliberately simplified and obscured at pueblos under direct Spanish control, religious imagery on white ware jars was deliberately amplified, elaborated and brought into the everyday domestic realm at one pueblo that was not under direct Spanish control. More overt displays of resistance included the appropriation and re-creation of Christian symbols on indigenous media such as rock art and decorated ceramics (Liebmann 2002). Thus, the revolt was not only military, but had a strong and highly visible ideological component.

Ideologies of Inclusion and Exclusion

In general, ideological movements can be categorized as inclusive or exclusive with respect to cultural tolerance, resistance, and by extension hybridity. Ideologies of inclusion can be found in many

colonial and post-colonial studies that emphasize positive or at least neutral immigrant-local interaction in the form of unconscious and intentional hybridity, multi-culturalism, and even ethnogenesis (e.g., Bhabha 1994 in Werbner 2001; Cordell and Yannie 1991; Gupta and Ferguson 1992; Ogburn 2008; Werbner 2001:134-136). Inclusive ideologies include world religions such as Christianity and Islam (Bird and Willets 2008; al-Faruqi 1986), particularly contemporary ecumenical movements and early forms prior to the development of sectarian schisms. In addition, meta-cultural constructs that emerge when groups from different cultural backgrounds attempt to form viable organizations can be considered ideologies of inclusion. These constructs can be found at all organizational scales, including the Salado (see previous research above; Crown 1994), early Colonial indigenous communities in the Southeast U.S. (Kowalewski 2007), ancient Mesopotamia (Yoffee and Clark 1993), and the obvious contemporary American example (Clark et al. 2011). By design, ideologies of inclusion are socially contagious because of perceived benefits for joining and membership based on adherence to core principles rather than ascription.

Ideologies of exclusion promote group solidarity based on opposition to a similarly defined group or larger organization in which the referent group is embedded. Obvious, examples are tribes, ethnicities, race-based ideologies, ultra-nationalist movements, and religious sects. Ideologies of exclusion frequently reference some "Other" as a source of tension regardless of context, power relations, and level of social complexity. The Other is a cultural, ethnic, religious, or national entity that the referent population views as monolithic and threatening. Negative actions by individual members of the Other become stereotypes for the entire group while positive actions are ignored. For example, fear of the Other by race-based European nation-states fueled Anti-Semitism well into the 20th century and is currently fanning the flames of Islamophobia in the larger context of a supra-national European Union (Bunzl 2005). Stolcke (1995) and Stoler (1999) argue that current anti-immigrant movements by the conservative Right in Europe are based on nuanced "doctrines of exclusion" that are considerably different from blatantly racist movements of previous centuries (Edelman 2001:302-303). However, such differences are superficial veneers applied to the universal concept of a dangerous and foreign Other. Even anthropologists cannot cleanse themselves of "Otherness" as they study traditional societies in exotic lands and then return home to contrast them with their own (Gupta and Ferguson 1992:14-16). The Other is pervasive in defining human groups; perhaps second only to kinship. Its roots probably lie deep in our evolutionary past.

For colonial powers and other dominant groups, ideologies of exclusion reify power structures that favor them or increase existing disparities in wealth and status. In extreme cases, the goal is to "remove" less powerful "Others" who are perceived to constitute a potential obstacle to growth (Bunzl 2005). For marginalized or disenfranchised groups, ideologies of exclusion are often strategies for survival in the face of acculturation by the dominant group or state. These ideologies can range from revolutionary, with the goal of reversing existing power relations (Brown 1991:399-401; Wilcox 2009) to more passive forms of resistance where mere survival is the objective (e.g., Dongoske and Dongoske 2002; Shah 2007, Sivaramakrishnan 2005). In highly asymmetrical examples, ideologies of exclusion are based on negative self-perceptions of the marginalized group. For example, the Teenek Indians in Mexico refer to themselves as poor "chickens" in contrast to wealthier Mestizo "turkeys" (de Vidas 2002:210-211). Teenek ideology is based on mutual respect, moderation, and reciprocity in order to maintain good relations with their pre-Christian ancestors. The Teenek have a fatalistic ideology that is consistent with their marginality and emphasizes persistence in the face of adversity. This ideology negatively views the higher quality of life associated with the Mestizos with whom they interact.

The conflicting goals of plurality and purity associated with inclusive and exclusive ideologies are seldom fully realized. In nearly all examined case studies of extended contact, hybridity can be measured by degree rather than presence or absence (Bhabha 1994; Brown 1991; Canessa 2000; de Vidas 2002; Radding 1997, Werbner 2001; Wilcox 2009). The exact character of hybridity is context-dependent and contingent upon unique historic processes that must be carefully examined. For example, the Teenek place special emphasis on the biblical story of Cain and Abel in interweaving Christianity with their indigenous cosmology (de Vidas 2002:218-219). Hybridity and cultural persistence can vary substantially within the same group through time (northern San Pedro example above, Brown 1991; Canessa 2000; Radding 1997; Wilcox 2009). The melding of indigenous religions with Catholicism was a common strategy employed by the Spanish to convert native groups throughout their New World empire. In rural Amazonia, Brown (1991) documents different millenarian movements that creatively and selectively combined elements of indigenous religion, including one contemporary indigenous movement that is ironically based almost completely on Catholicism, the ideology of the dominant "Other."

Exchange Crosses Ideological and Cultural Boundaries

Material culture case studies suggest that exchange networks often cross cultural and ideological boundaries regardless of the level of resistance or isolation, except during intervals of violent conflict. Thus trade is often the last form of interaction to be disrupted by resistance. For example, the indigenous post-contact Taíno settlement at En Bas Saline on the northeast coast of Haiti exhibits few indications of European influence when compared with the pre-contact settlement, although the occupation lasted well into the 16th century and was near a Spanish settlement (Deagan 2004). European influence was limited to edible fauna, a few metal and glass items, and some earthenware. With the possible exception of the latter all were exchange goods with high economic value.

In summary, colonial and post-colonial case studies offer a wealth of data about hybridity and cultural resistance. Although many details are beyond archaeological detection, several basic lessons can be drawn that are relevant to archaeology. First, extended cultural contact results in at least limited hybridity regardless of ideological orientation and negative perceptions of the Other. Second, ideological resistance and isolation are more common than violent conflict in halting the spread of popular ideologies. Ideologies of inclusion foster hybridity, whereas ideologies of exclusion discourage this process. Each ideology should produce measurable differences in cultural mixing. Dominant and marginalized groups employ these ideologies differently, with exclusive ideologies often used for cultural survival by the latter. Finally, commodities are likely to cross ideological boundaries except under extreme circumstances.

BRIDGING POST-COLONIAL THEORY AND PRE-COLONIAL ARCHAEOLOGY

Recognizing that nearly all culture contact situations impact both groups, cultural persistence and resistance to the Other can best be measured by the extent of hybridity rather than mere presence or absence. In our case, the Other is a Kayenta immigrant minority and hybridity is represented by the inclusive Salado ideology. Compared to groups participating in inclusive ideologies, those practicing ideologies of exclusion should exhibit less hybridity, particularly the intentional or conscious dimension expressed on symbols on highly visible media (Werbner 2001). Hence both ideologies can be expected to produce different material culture patterns.

Previous research by CDA and others has identified enculturative markers (e.g., perforated plates, entry boxes, use of Rocky Mountain bee plant) that demonstrate the physical presence of Kayenta. In addition, pottery manufacturing techniques such as the coil-and-scrape and paddle-and-anvil methods and wall construction techniques (shaped slab masonry vs. adobe) can be used to differentiate between local groups and ancestral Puebloan immigrants.

Symbols of exclusionary ideologies should be associated with their corresponding enculturative group, as exemplified by San Carlos Red-on-brown found at local settlements and Maverick Mountain Series ceramics largely associated with immigrant enclaves in the northern San Pedro immediately after Kayenta immigration. In addition, local groups built platform mounds while Kayenta groups constructed kivas in their settlements. Visibility and context of display of exclusionary symbols should correlate with the power of the associated group (Clark 2001). Here, both groups initially expressed cultural differences on highly visible media and in public contexts, suggesting fairly symmetrical power relations despite the relatively small immigrant population.

Adoption of the inclusive Salado ideology is indicated by high frequencies of Salado polychrome pottery that replace earlier, exclusionary decorated ceramic traditions at both Kayenta and local settlements in our previous study areas. However, vestiges of earlier traditions persisted. For example, despite the high density of Salado polychromes at all 14th century settlements in the northern San Pedro, cremation burial continued at local settlements (Franklin 1980) while immigrant descendants practiced inhumation burial traditions of their ancestral homeland (Gerald 1975). This is consistent with heterogeneous mortuary programs in other regions dominated by Salado polychromes (see Figure 1b; Crown 1994; Haury 1945; Nelson and LeBlanc 1986), suggesting multiple ethnic groups participated in Salado ideology.

Exchange networks can be associated with inclusive ideologies, but can also cross boundaries defined by exclusionary ideologies. Obsidian became a valued commodity across much of the Southwest during the 14th century (Hill et al. 2004; Shackley 2005). Because of its restricted distribution and the unique chemical signature of each source area, obsidian represents the ideal commodity to reconstruct long-distance trade networks that can be compared with cultural and ideological boundaries. Mule Creek

obsidian is particularly relevant to our case study since its distribution has been connected with a Kayenta diasporic community (see Previous NSF Work Sets the Stage; Huntley et al. 2010).

The above material correlates can be used to identify Kayenta enclaves and participation in or resistance to Salado ideology along the three research transects as summarized in Table 1 (See Figure 1b). Each transect is associated with a distinctive decorated ceramic ware that reflects local traditions and perhaps influence from other regions. We know from limited data that local cremation burial customs remained the dominant mortuary practice in all three transects (Di Peso 1953; Shelley and Altschul 1996, Swartz in prep.). Hence we have evidence for persistence in at least one important ideological category.

The presence of Kayenta enclaves as well as high densities of locally produced Salado polychromes and Mule Creek obsidian from Kayenta-mediated exchange networks indicate low resistance and hybridity; particularly if local decorated ceramic traditions ended with the introduction of Salado polychromes. The absence of enclaves, Salado polychromes, and Mule Creek obsidian can be interpreted either as a lack of exposure or active resistance. Between these extremes, numerous possible combinations indicate varying levels of tolerance and resistance.

A critical issue is determining whether local settlements that exhibit no evidence for Kayenta immigrants and Salado ideology actively resisted both or simply were not exposed to either because of environmental marginality or isolation. If the latter were true, Kayenta and Salado material correlates should follow a simple distance decay model along the research transects in Figure 1b, gradually diminishing as one moves away from Kayenta migration zones into more marginal areas. Conversely, local decorated ceramic types would gradually increase and boundary permeability should be relatively high. However, sharp and impermeable boundaries with high densities of local and Kayenta/Salado material correlates on either side would be inconsistent with a distance decay model and suggest intentional resistance rather than isolation. Thus, a distance decay model that takes into account terrain will be used as a null hypothesis for active resistance to the Kayenta and Salado. Where deviations from the null hypothesis are found (e.g., sharp ceramic and obsidian boundaries, preference of remote sources over proximal ones) other evidence for active resistance and possible conflict will be carefully examined. This includes settlement layout (e.g., defensive construction, evidence for unplanned aggregation) and settlement pattern (e.g., buffer zones, defensible locations). In addition, changes in local decorated ceramic traditions that survived the introduction of Salado polychromes will be evaluated using post-Pueblo revolt stylistic changes as analogies.

Table 1. Material Culture Expectations of Resistance and Isolation.

Low Resistance	Kayenta enclaves present as indicated by enculturative markers High Salado polychrome frequencies at enclaves and local settlements with local production centers Cessation of local decorated ceramic traditions Exclusive or dominant Mule Creek obsidian source use
Moderate Resistance	Little or no Kayenta presence as indicated by enculturative markers Moderate Salado polychrome frequencies with minimal or no local production Temporal overlap of local decorated ceramic traditions with Salado polychromes Local design styles influenced by Salado polychromes Mule Creek and proximal obsidian source use
High Resistance	Little or no Kayenta presence Low Salado polychrome frequencies with no local production; dominance of local ceramic traditions Exclusive or dominant use of proximal obsidian sources Sharp boundaries between Kayenta/Salado and local material culture Correlation of material culture boundaries with defensive settlements and buffers zones No correlation of ceramic/obsidian boundaries with environmental marginality or topographic barriers Reactionary changes to Salado polychromes in local ceramic styles
Isolation	No Kayenta presence Low Salado polychrome frequencies with no local production; dominance of local ceramic traditions Near exclusive use of proximal obsidian sources Clinal distributions of Kayenta/Salado and local material culture that follow a distance decay model or Kayenta/Salado and local boundaries that correspond with topographic barriers Low population density and environmental marginality

Key demographic, environmental, and topographic variables will be compared in a GIS with Kayenta/Salado and local boundaries defined by ceramics and obsidian to differentiate between active resistance and lack of exposure due to isolation. These variables will include population density, agricultural potential, and topographic barriers to movement in this basin and range context. This comparison in tandem with our previous research will shed light on the spread of Salado ideology. Did it simply follow major river valleys toward densely populated areas, bypassing marginal areas, or was the process more complex and dependent on social rather than environmental and demographic variables?

Finally consultation with the Tohono O’odham, the closest descendants of late pre-contact groups in the project area, and a study of early Spanish documents will be conducted to shed light on traditions and ceremonies that suggest contact with Puebloan groups such as the Kayenta during the late pre-contact period. This research will hopefully yield detailed evidence of selective borrowing that is typically beyond archaeological detection (see below).

RESEARCH TRANSECTS

Figure 1a shows the primary zones of Kayenta immigration and local-immigrant interaction that resulted in cultural hybridity and produced the inclusive Salado ideology. Figure 1b shows the area that Salado ideology spread as defined by dense distributions of Salado polychromes, with production in many valleys (Clark 2007; Clark and Lyons 2011). Planned data gathering is focused along three broad transects (Table 2) that originate in well-documented areas of Kayenta immigration (Clark and Lyons 2011; Lindsay 1987; Lyons and Lindsay 2006; Neuzil 2008) and traverse the “Salado edge”. Along each transect, we will examine the persistence of local traditions, extent of hybridity, and lack of exposure or active resistance to the Kayenta and Salado. Each transect will be examined separately and compared using the strategy summarized in Table 1. The combination of museum work, field work, analysis, and tribal consultation proposed here will provide the necessary data.

Table 2. Description of the three research transects and numbers of sites sampled by transect.

Transect	Immigrant Zone	Description	Sample Sites*
East	Safford/ Aravaipa	Runs SE through area of internal drainage (Willcox Playa) to higher elevation, foothills zones at canyon mouths or high water table areas	4/7 (11)
Central	Cascabel- San Pedro	Runs SE upstream on San Pedro; distinctive local architecture and decorated ceramic type marks local group identity	0/4 (4)
West	Cascabel- San Pedro	Runs west across Tucson Basin, through lightly populated Altar Valley to foothills zone of Coyote Mountains; strong indicators of local identity evident with Tanque Verde Red-on-brown, architecture and settlement pattern	7/8 (15)

* Format: tested sites/archival sites (total sites)

Together, the three transects are also designed to consider the demographic and environmental dimensions of marginality and isolation. All transects begin in previously studied riverine settings where intensive irrigation supported relatively dense populations. All transects extend to areas of lower agricultural productivity. The West Transect, especially the segment through the western Tucson Basin, is probably the least marginal and most populated of the three and provides a contrast with other two. Ceramic, obsidian, environmental, and demographic data will be compiled in a GIS for synthetic analysis.

Each transect has undergone sufficient archaeological survey so that regional settlement patterns can be characterized at a general level. However, relevant artifact information that addresses the central themes of resistance to the Kayenta/Salado and persistence of local traditions is sparse, especially the location and character of key material culture boundaries. Data gathering will prioritize previous excavations and museum collections. For example, the Central Transect requires no new excavation, and all transects tap major existing collections (e.g., Dart et al. 1990; Di Peso 1951; Gabel 1931; Hayden 1957; Myers 1985; Ruble 2011; Shelley and Altschul 1996; Swartz in prep.; Wright and Gerald 1950). Where new excavation is proposed, we will gain representative ceramic, obsidian, and paleobotanical samples from trash deposits at each site. The result will be a controlled sample that allows accurate comparisons of densities of relevant artifacts in Table 1 to evaluate distance decay and deviations from it. Pollen and flotation samples will also be collected to evaluate differences in plant use, including the Rocky Mountain bee plant for black organic paint on Salado polychromes (see above; Clark and Lyons 2011; Adams et al. 2002). The three research transects and sites associated with each are described in detail below.

East Transect: Southern Sulphur Springs Valley/Chiricahua Mountains

Collections from eleven sites will be investigated in this transect. The presence of Kayenta migrants in the Safford Basin and the Upper Aravaipa drainage has been documented by previous research (Clark et al. 2004; Duffen and Hartmann 1997; Neuzil 2008; Woodson 1999). At the southern end of the transect, excavations have been carried out at the 13th century Ringo site (Johnson and Thompson 1963), the 14th century Kuykendall site (Mills and Mills 1969) and five late pre-contact sites around the Chiricahua Mountains (Myers 1985) that provide collections before and after the appearance of Salado polychromes. All are obscurely or incompletely published. Four sites in this area (Noonan Canyon, Sunsites, Nolan, and Christian) are scheduled for test excavation. They will provide a sample that extends across the Sulphur Springs valley and around the eastern foothills of the Chiricahuas. Existing data from 13th century contexts indicate relatively high frequencies of locally made corrugated ceramics and El Paso Polychrome. Myers (1985) also reports a high obsidian frequency at the late Classic period Darnell site, a possible indication of Salado influence at this one settlement if the primary obsidian source is Mule Creek. Previous excavations also show at least some Playas Red Ware and Ramos Polychrome from southwestern New Mexico and northern Chihuahua. Thus assemblages from Joyce Well and other sites influenced by Paquime in southwest New Mexico will also be considered (Skibo et al. 2002).

Central Transect: Upper San Pedro

Collections from four previously investigated sites will be analyzed in this transect. The southern-most district in the northern San Pedro provides rich data on Kayenta migration based on CDA work and previous research (see above, Clark and Lyons 2011; Di Peso 1958). In addition, that work provides well-documented examples of local platform mound communities in the northern districts initially resisting Kayenta immigrants, but ultimately adopting Salado ideology and mixing with immigrant descendants. CDA assessments, as well as the original interpretation (Tuthill 1947), showed a lack of evidence for immigrants at Tres Alamos, a site just south of the Kayenta enclave district and at the northern edge of the Central research transect. The area farther south is associated with a local decorated ceramic type called Babocomari Polychrome, as well as distinctive domestic architecture (Di Peso 1951; Shelley and Altschul 1996). Both appear to be spatially restricted to the area along the Babocomari drainage. Large collections are available from previous excavations by the Amerind Foundation at two sites (Di Peso 1951; Gerald 1954), as well as one private collection that again provide pre- and post-Salado comparative collections. In addition, we hope to obtain ceramic collections from the Garden Canyon site on Fort Huachuca (Shelley and Altschul 1996). This transect takes advantage of previously excavated materials to consider the resistance or lack of exposure to Salado ideology that is so pervasive a short distance to the north along the San Pedro.

West Transect: Tucson Basin/Eastern Papaguería

Collections from fifteen sites will be considered in this transect. CDA has surveyed and mapped numerous late pre-contact sites in the Tucson Basin and Eastern Papaguería (Dart et al. 1990; Doelle et al. 1985; Doelle and Wallace 1986). Some excavation data also exists from recent CRM projects (Heckman and Altschul 2007; Ruble 2011; Swartz in prep.; Stinson and Heidke 2007). Fieldwork at the late pre-contact sites of Jackrabbit Ruin, Martinez Hill, and University Indian Ruin that took place in the 1930s and 1940s will be re-examined (Anonymous 1936, Gabel 1931, Hayden 1957, Scantling 1940). In 2010, Desert Archaeology, Inc. mapped three large platform mound settlements at Martinez Hill and the University of Arizona is currently conducting a field school at University Indian Ruin. These data sources will also be utilized.

Preliminary ceramic data shows a directional pattern in Salado polychrome distribution in the Tucson Basin with high densities in the east that drop off in the basin proper and are very low in the west. Sells Red, a type originating in the Papaguería, exhibits an inverse spatial distribution. Tanque Verde Red-on-brown, produced by local Tucson Basin groups (Doelle and Wallace 1990; Heidke 1986, 1988, 2009; Heidke and Miksa 2009; Wallace 1998), is dominant along the Santa Cruz River and declines both to the east and west. The bold exterior designs on Tanque Verde Red-on-brown (Heckman et al. 2000; Wallace 1987; Whittlesey 1987) may indicate local resistance to Salado ideology.

The Western Transect is the only one that contains platform mounds, a ceremonial architectural form connected with the local inhabitants of southern Arizona. Tucson Basin mounds do not follow the highly consistent pattern documented for the Phoenix Basin (Gregory 1987). This variability may be the product

of unplanned aggregation in response to social tension generated by the adoption and rejection of Salado ideology by different groups in the region. The proposed test excavations at sites just outside the Tucson Basin at the western edge of this transect will supplement existing data to determine the boundary and the degree of temporal overlap between Salado polychromes and Tanque Verde Red-on-brown, as well as possible stylistic changes in the latter through time that can be attributed to resistance to the Salado.

ANALYTICAL METHODS

Planned analyses will allow us to assess the degree to which local communities tolerated Kayenta immigrants and the degree of exposure and resistance to the inclusive Salado ideology that subsequently developed. The analysis of key ceramic types and obsidian will be prioritized to determine the location and character of their boundaries. Changes in ceramic styles may also shed light on resistance or adoption of Salado ideology. Paleobotanical analyses will aid in determining the presence of Kayenta immigrants. Finally, demographic trends, agricultural potential, topography, and settlement layout will be compared with artifact distribution patterns in a GIS. Collaboration with a Tohono O’odham research team and ethnohistorical review of early Spanish documents will complement archaeological analyses, particularly in the Western Transect.

Ceramic Analyses

Comparing ceramic assemblage information within and among transects will allow us to identify boundary locations and permeability along each research transect that can be used to assess exposure to the Kayenta and resistance to Salado ideology. Ceramic studies (Table 3) will include 1) typological assignment and comparison of key type distributions within and among transects, 2) technological and decorative attribute analysis of local types made both prior to and after the introduction of Salado polychromes, and 3) compositional analysis to identify production loci and track exchange of both local and Salado types. Dr. Deborah Huntley will supervise the ceramic analyses with the aid of student research assistants.

Table 3. Analyses and target sample sizes by transect.

Transect	Attribute Analysis ^a	Temper ID	INAA	Petrography	Obsidian XRF	Collections Locations
East	1000	300	90 ^b	approx. 10 ^c	100	Amerind Foundation; Arizona State Museum; Cochise College; new test excavations
Central	1000	300	90	approx. 10 ^c	100	Amerind Foundation; private collections; Ft. Huachuca
West	1500	400	120 ^b	approx. 15 ^c	100	Arizona State Museum; private collections; new test excavations
TOTAL	3500	1000	300	35^c	300	

^a Includes technological attributes for utility ware and decorative attributes for slipped/painted ware.

^b Additional samples analyzed in NSF Award 819657 are available for comparison.

^c Additional samples from various CRM projects are available.

Ceramic ware and type frequency data will be compiled from a representative sample of sites in each transect. Table 4 summarizes these by inferred cultural affiliation and transect. For example, perforated plates are important enculturative markers for Kayenta immigrants (Lyons and Lindsay 2006). Some of the ceramic frequency data has been compiled in the SWSN database discussed previously. Additional information will come from unpublished reports, unanalyzed collections and limited fieldwork. Many sites in our three transects have existing collections but either lack systematically recorded data or need to be reexamined using new typologies (Lyons 2004; Neuzil and Lyons 2006).

Establishing the production date ranges for decorated pottery types in the study area is critical in assessing whether local types overlapped with Salado polychromes. Ceramic cross-dating of Maverick Mountain Series, Salado polychromes (Lyons 2004), and other non-local decorated wares in study area sites will help anchor site occupation dates, especially those dominated by poorly dated local wares.

Each transect has at least one local utility ware with potentially unique technological styles that can help identify local and immigrant communities of practice (Clark 2001; Lechtman 1977; Sackett 1985; 1986; 1990; Stark et al. 1998). These differences might be obvious, as in different manufacturing

methods such as the coil-and-scrape technique versus paddle and anvil, or more subtle. Forming technique, interior and exterior surface treatment, maximum vessel and aperture diameter, and vessel rim form will be recorded. Analysis of at least 50 utility ware vessels per site will yield a total of 1200 vessels.

Table 4. Key ceramic wares for analysis by transect.

Ware	East	Central	West
Salado Polychromes (Salado ideology/hybridization)	√	√	√
Maverick Mountain Series (Kayenta immigrant)	√	√	√
El Paso Polychrome (local SE AZ and southern NM)	√		
Babocomari Polychrome (local southern San Pedro)		√	
Tanque Verde Red-on-brown (local Tucson Basin)			√
Sells Red (local Papaguería)			√
Utility Ware (local and Kayenta immigrant)	√	√	√
Perforated Plates (Kayenta immigrant)	√	√	√

A sample of decorated sherds will be selected for stylistic attribute analysis to determine to examine changes in local ceramic design before and after the introduction of Salado polychromes. Decorative styles on any media, including pottery, are conscious displays of ideology, cosmology and macro-group identity within traditional societies (Eckert 2008; Hegmon 1992; Hodder 1982; Plog 1990; Sassaman and Rudolphi 2001; Wiessner 1985, 1989; Wobst 1977). Comparisons of decorated styles through time will help us determine the extent to which settlements subscribed to exclusionary local ideologies or the inclusive Salado ideology. We hypothesize that local groups who actively resisted the Salado expressed their own identities on local decorated pottery types (e.g., Spielmann et al. 2006). Conversely, groups who selectively adopted elements of Salado ideology may have also selectively added Salado polychrome design motifs to their local decorated wares.

Because we have access primarily to sherds rather than whole vessels, a limited suite of stylistic attributes will be recorded, such as color scheme and design elements. At least 100 decorated sherds from each site will be analyzed for a total of 2300 sherds (see Table 3). Previous studies of local decorated traditions (e.g., Heckman et al. 2000 for Babocomari Polychrome; Miller 1995, 2008 for El Paso Polychrome; Wallace 1997; 1988 for Tanque Verde Red-on-brown) provide a starting point for our analysis. Local styles will be compared with existing data on Salado polychrome styles (Crown 1994; Lyons 2003, 2004, in prep.). Methods will follow those used in other studies of late prehistoric pottery types, such as Rio Grande Glaze Ware (Eckert 2006; Mobley-Tanaka 2002; Spielmann et al. 2006) and Hopi Yellow Ware (Hays-Gilpin and LeBlanc 2007; LeBlanc and Henderson 2009). Statistical measures of diversity will be used to evaluate homogeneity in stylistic attributes within and among wares in each research transect. Along with qualitative interpretations of specific motifs and design elements, measures of diversity will allow us assess the relative impact of Salado design style on local traditions.

The third phase of ceramic analysis will establish production locations and distribution ranges for Salado polychromes and local decorated wares in the three research transects. If ceramic designs convey important ideological information (Crown 1994; Mills 2007), production loci of local decorated wares were possible centers of local resistance while production loci of Salado polychromes may have been settlements that facilitated the spread of Salado ideology. We will pick a subset of decorated and utility wares (1000 sherds) from the attribute analysis sample for refiring studies to collect information on clay sources and firing regime. This information will be used in conjunction with binocular temper identifications by petrographer Dr. Mary Ownby and ceramic specialist James Heidke to identify ceramic temper provenance locales or petrofacies (Castro-Reino et al. 2003; Heidke et al. 1995; Heidke et al. 1998; Miksa and Heidke 1995; Miksa et al. 2004). This will help structure the sample submitted for Instrumental Neutron Activation Analysis (INAA).

We will submit a total of 300 samples (90-120 per transect) to the University of Missouri Research Reactor (MURR) for INAA (Bishop et al. 1982; Glascock 1992; Neff and Glowacki 2002) to define chemical compositional groups. Once the INAA and binocular petrographic results have been compared, a sample will be selected for thin sectioning and point counting to verify the results and identify the production centers of each relevant ware with as much precision as possible.

Limited existing petrographic and INAA data for key wares will be incorporated into this study. These include data from Kuykendall in the East Transect and Yuma Wash and Zanardelli in the West Transect

(Ruble 2011; Swartz in preparation). Similar data from previous CDA study areas (see Figure 1a; Clark and Lyons 2011; Neuzil 2008) and other adjacent regions (Miller and Ferguson 2010) will provide useful comparative examples.

Obsidian Analysis

The geographic extent and relative frequencies of obsidian from various sources in our study transects will be determined by XRF obsidian sourcing. XRF analysis is a highly accurate means of determining obsidian provenance, with nearly 50 sources chemically characterized across the Southwest (Bayman and Shackley 1999; Marshall 2002; Shackley 2005). Obsidian samples from existing collections will be augmented by surface collection and test excavation. A large body of obsidian XRF data is available for comparison from the SWSN project.

XRF analysis of 300 obsidian samples (100 from each transect; see Table 3) will be conducted by Steven Shackley. Measures of obsidian density (percentage of obsidian in flaked stone assemblage) will focus on sites with excavated, screened artifact samples. Relative source frequency will focus on proportions of Mule Creek obsidian with respect to more proximal sources. Our previous research has associated the circulation of Mule Creek obsidian and an overall increase in obsidian density in the southern Southwest with the emergence of a Kayenta diasporic network. Source frequency and density, will be compared with a terrain adjusted distance-decay model. Deviations from this model will be used to identify the presence of social networks that facilitated the circulation of specific sources and social boundaries that inhibited access to others.

Demographic and Environmental Modeling

Population density, demographic trends, and changes in settlement pattern, including the development of buffer zones, will be reconstructed within and among the three research transects at 50-year intervals during the late pre-contact period. The Coalescent Community Database described above will provide the foundation for new data added by the proposed project. Environmental modeling will include measuring hydrological and agricultural potential in each research transect. In addition, specific localities that are optimal for irrigation farming will be identified based on floodplain morphology and bedrock geology. These studies will allow us to systematically assess marginality within and among research transects. Comparison with ceramic and obsidian data will help determine whether the absence of Kayenta and Salado ideology can be attributed to isolation or active resistance.

Finally, terrain will be factored into distance-decay models (our null hypothesis in assessing active resistance) using least-cost path analysis. Mountain ranges and other barriers to movement will be compared with well-defined ceramic and obsidian source boundaries. Social factors will be further explored when these do not coincide through detailed studies of settlement pattern and layout as well as other available information. Dr. J. Brett Hill of Hendrix College will conduct both the demographic and environmental analyses and compile all project data into a GIS to facilitate synthetic analyses.

Tohono O'odham Oral and Documentary History

In addition to the archaeological component of this project, we will collaborate with a research team from the Tohono O'odham Nation, the group with the strongest claim for continuity with the late pre-contact inhabitants of our study area. O'odham speakers were present in the Central and West research transects at the time of Spanish contact. Doelle (1981) and Doelle and Wallace (1990) have argued that the San Xavier and Santa Rosa areas were the major population centers during the 1690s, while the Salt River was largely unpopulated and the Gila and San Pedro valleys had smaller populations. This demographic pattern is a dramatic reversal from that of the late pre-contact period.

The West Transect traverses the eastern boundary of the Tohono O'odham Reservation. We propose to augment our archaeological research in this transect in partnership with a Tohono O'odham team that is already working with Dale Brenneman of the Arizona State Museum on interpreting early Spanish documents that mention indigenous groups in southern Arizona. This experienced team will join in a review and discussion of published accounts of the Tohono O'odham Wi'igita ceremony. This important ritual was traditionally performed at Santa Rosa (Gu Achi) in southern Arizona and Quitovac in northern Sonora (Hayden 1987; Jones 1971; Mason 1920; Underhill 1946). We will focus on the Santa Rosa Wi'igita ceremony, which contains many Puebloan elements (Underhill 1946) that may have been adopted through contact with the Kayenta and exposure to Salado ideology. Comparing information from

Hopi and Zuni during her research with the Tohono O'odham, Underhill (1946:328) notes: "we might suspect an actual borrowing between the two regions, and that at not too remote a time. Since archaeological findings now reveal a good deal of movement in both directions just previous to the historic time period, this supposition may not be impossible." Through seminars at the Tohono O'odham cultural center and field trips to visit sites within each of our three research transects, this research team will collaborate in exploring the history of the Wi'igita ceremony and what that might reveal about late pre-contact sites at the edge of Salado. This approach provides a unique opportunity to move beyond archaeological methods to examine the process of cultural hybridity in detail. In this case, ancestral O'odham may have selectively reworked specific elements of this ideology into their own traditions similar to the Teenek example cited above. A letter of interest by the Tohono O'odham Nation Cultural Center and Museum in collaborating on this project is a supplementary document to this proposal.

BROADER IMPACTS

CDA research efforts are designed to benefit multiple audiences. This project employs a new theoretical perspective that will further our long-term research program into migration and the dramatic demographic transition that broadly affected the late pre-contact Southwest. This project has a substantial educational impact, is tied to a program of archaeological site protection, reaches out to local communities, and includes a significant collaboration with the Tohono O'odham Nation.

One advanced graduate student will be provided full support for three years to work on this project through the CDA's endowed Preservation Fellowship program. This student will complete a doctoral dissertation using data from this project. That graduate student will co-direct the fieldwork under supervision of Dr. Jeffery Clark. Undergraduates and volunteers will also be involved in the field effort and subsequent artifact analyses. The project team will also work closely with CDA's Site Protection specialist, a full-time position devoted to working with private landowners to develop conservation easements and other site protection measures.

Scientific publications resulting from this work will include a doctoral dissertation, one article in a regional (*Kiva*) and national journal (*American Antiquity*), and a special issue of CDA's quarterly magazine, *Archaeology Southwest*. *Archaeology Southwest* is widely used in university classes and is read by general audiences internationally. We also plan to disseminate our results to the professional community through 1) presentations at national meetings of the Society for American Archaeology, 2) local avocational groups such as Arizona Archaeological Society, and 3) presentations to government and cultural resource personnel of tribal groups with ancestral ties to the study area. Project results will be presented to the general public through various outlets, including the CDA website and lectures in Tucson and other local communities in or near the three research transects.

While the results and interpretation of our research will be made available in various venues, the database generated by this project will contain locational and other information that is too sensitive to be available on the internet. We will provide our database to all institutions, agencies, and individuals who manage sites or collections we include in our study. Metadata formats will meet Federal Geographic Data Committee guidelines for spatial data. Ceramic frequencies, obsidian sourcing data, and architectural information will be added to the SWSN database, where it will contribute to ongoing network analyses. Information sharing and access is discussed in more detail in the Data Access Plan.

A particular strength of this project is the planned collaboration with the Tohono O'odham Nation. Two CDA archaeologists and a Tohono O'odham team will consider published accounts of a key ceremony that has many elements of both O'odham and Pueblo traditions and may be a source of insights into the hybrid archaeological elements of Salado. Our collaborators at the Tohono O'odham Museum are enthusiastic about this project (see full letter in supplementary documents): "While the Museum is expected to carry the Nation's legacy, we hope that this project will help rekindle a discussion on current religious integrity versus ancestral practices among elders, storytellers, historians, and activists."

After award of this grant, CDA will apply for funding to the NSF program for Sharing Science with Public Audiences. We are completing a current grant from this program, which involved partnering on a traveling museum exhibit with Pueblo Grande Museum. The exhibit was subsequently at the Huhugam Ki Museum on the Salt River Pima Maricopa Indian Community and CDA staff members engaged in multiple outreach activities there. The exhibit will soon been displayed for a year at the Anasazi Heritage Center. The Preservation Fellowship, site protection program, and publication of an issue of *Archaeology Southwest* are all covered by separate CDA funding sources and are not part of this funding request.

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