A Report on Archaeological Research
In the Santa Cruz River Basin

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This report has been prepared for the Rio Quemado, Rio Frijoles, Rio en Medio and
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There is a significant regionalization of ceramic traditions during the Classic Period. Puebloan peoples settled within and north of the Galisteo Basin largely manufactured black-on-white "biscuitwares." This includes the Pajarito Plateau, the Chama River Valley, and the Rio Grande Valley north to San Juan Pueblo. We would include the Santa Cruz River drainage in this ceramic tradition during the Classic Period, though we do not yet know to what extent the Classic Period occupants of the area made or traded for biscuitware pottery given the paucity of excavated settlements. In contrast, glaze-painted redware and polychrome pottery was made in settlements to the south of the biscuitware region (Mera 1934).

During the mid-15th century, roughly associated with the Biscuit B phase of the Classic Period, there is a region-wide shift in settlement to lower elevations. As noted by Mera nearly seventy years ago, later Classic Period sites tend to be found close to the floodplains of major rivers and drainages. There is a significant increase in site size and a concomitant decrease in the overall number of settlements. In the Nambé region just south of the Santa Cruz drainage, Skinner (1980: 17) notes that only one higher elevation settlement continued to be occupied during the latter part of the Classic Period, with the remainder moving to the vicinity of modern Nambé Pueblo. The same downslope trend in settlement is reported for the southern Pajarito Plateau (Powers and Orcutt 1999).

The overall number of settlements with Classic Period components in the study area (n=26) drops significantly compared to the Coalition and Developmental Periods (Appendix I, pgs. 54-56). Standardizing this to period duration we get approximately 9 sites per century. Though this is a low site total per century, we also have to realize that overall settlement size increased substantially during the Classic Period, particularly later in the Biscuit B phase. The distribution of settlements is still fairly widespread in the study area (Figure 2). As noted above, the lack of ceramics from excavated contexts means that we cannot dependably differentiate those settlements with either early or late Classic Period occupation components.

**Historic Period (A.D. 1539/1600 - Present) Occupation in the Study Area**

Clearly one of the most important questions embedded in this research is to what extent the study area was utilized for settlement and other forms of land use by Pueblo and Hispanic populations during the Historic Period. Of all the time periods represented
in the ARMS files and this report, we know the least about the Historic Period from an archaeological perspective. This is not a problem that is relegated solely to the Santa Cruz drainage, but is endemic to most of the American Southwest. The majority of the archaeological research conducted to date in the Southwest has focused on ancestral Native American contexts. Archaeological excavation of historic sites has been driven largely by public archaeology projects associated with development in Santa Fe and other historic urban centers.

Before discussing the site file information, a note about chronological concerns. Site records variously identify the beginning of the Historic Period as 1539, the date of the Coronado Expedition, and 1600, approximately the date of the first significant Hispanic settlement in the region. Because the individuals completing the site forms in the ARMS files appear to have used both of these dates as the advent of European occupation in the region, I recognize either one in assigning site components to the Historic Period.

Relative to the Classic Period occupation of the study area, there is clearly a drop in the number of both Pueblo (n=10) and Hispanic (n=22) sites assigned to the Historic Period (Appendix I, pgs. 54-56). This is due to a number of factors discussed below in this report. First, there are significant problems in identifying Historic sites based solely on ceramics. Historic pottery assemblages (discussed below) tend to be dominated by undecorated plainwares, often making it difficult to differentiate these types from late prehistoric plainwares. Second, as discussed earlier in this report, many of the early Hispanic settlements were relatively small, housing one or two extended family groups. Site visibility becomes a significant issue in these cases, particularly since many of the early sites underlie present day Hispanic settlement at places like La Puebla, Santa Cruz, and Chimayo. Finally, we are faced with the very complicated issue of utilizing relatively homogeneous ceramic wares to assign cultural identities to past peoples.

**Historic Site Excavations in the Santa Cruz River Basin**

To better understand the presence and archaeological visibility of historic period occupations in the study area, a series of small-scale excavations were conducted in 2005 and 2006 at selected sites that showed surface evidence of historic period ceramics. The two primary reasons for the excavations were first, to test whether surface indications of
historic occupation would be borne out by more intensive investigations of subsurface deposits, and second, so see if the historic occupations actually began earlier than the contact period, and were perhaps masking earlier occupations of indigenous peoples. Of particular interest was whether these occupations contained evidence of occupation from the late Classic period which has very little evidence of permanent settlement in the region (see above).

Due to limitations of time and funding, two sites were chosen for test excavations, and an additional four sites were surface collected to provide temporally sensitive samples of ceramics. The first site, named the Quintana site after the site landowner, is located in the La Puebla area of the Santa Cruz River basin. Surface indications of both historic and prehistoric ceramics had been noted during earlier site visits. The second site is located on the grounds of the morada of the D’Esquipula chapel located three miles west of Chimayo. The five sites from which surface samples were collected include the Developmental sites (see Appendix II, pgs. 58-65) located just east of the Montez Site (LA 4994), the Montez Site itself, the Jaramillo Site, Tom Hererra site, and the cluster of sites located on the grounds of the Rancho de Chimayo restaurant located just outside of Chimayo.

No structural remains were encountered in any of the excavations, nor were there any such remains recorded on the surface-collected sites. The analytical technique is based on the presence or absence of known, dated ceramic types found in the study area as well as throughout the northern Rio Grande region. A suite of 40 types, including decorated and undecorated wares, was compiled from data summaries of Marshall and Walt (2007) as well as numerous other publications in the region. The goal was to provide a representative population of datable ceramic types for the area, and compare the presence/absence of this ceramic population across the sites included in this study.

A graphing of ceramic manufacture periods, divided into 50-year segments, shows that there is variation in the number of ceramic types throughout the 900-year time span included in this study (Table 2). The number of known types varies from three types in the 1100-1150 time period to fourteen different types that are believed to have been made and in use during the period between 1700-1750. Of particular note for this study is the fact that the time period of greatest interest, 1450-1600 has between six and
eleven known types. Given this number of datable types, if occupations were present in these sites during this crucial time span, they should be present in the ceramic samples from the sites.

A summary of the presence and absence of these temporally sensitive ceramic types (Tables 2-6) reinforces the settlement pattern observations made above with respect to temporal differences in village occupation in the Santa Cruz River basin. In each of the samples from surface and subsurface deposits there is a significantly smaller representation of ceramic types from the middle and late Classic period compared to the time periods before and after this time span. Notably absent are those ceramic types diagnostic of the late 15th and 16th centuries, primarily the decorated wares Biscuit B and Glaze C and D. There is a very small representation of Sankawi black-on-cream in the overall sample, but there is also a lack of agreement among ceramics experts regarding the temporal span of this distinctive ceramic type. For example, Adler and Dick (1999:76) date the inception of Sankawi at about AD 1550, and place the end date for Tsankawi at AD 1650 at Picuris Pueblo, an archaeological context with strong absolute dates located northeast of the study area. Mera (1933, 1935) and Wilson (2005) estimate an earlier beginning of AD 1500 to this ware. The later inception date is followed in this report.

The primary ceramic indication of late 15th and 16th century occupation in the study area sites comes from micaceous and culinary wares, none of which have distinctive surface decorations. The manufacture and use of micaceous and other culinary wares is part of a long-lived tradition in the northern Rio Grande, and there is even less agreement on beginning and end dates for these undecorated wares as there is for types such as Tsankawi black-on-cream.

In contrast to the dearth of middle and late Classic decorated ceramics in the ceramic samples from the Santa Cruz sites, there is a consistent presence of Developmental, Coalition and early Classic ceramics in all of the samples (Table 2). Similarly, those sites with reports of historic occupations contain ample evidence of post-17th century ceramics, including Kapo black and San Juan redwares (Tables 2-6). Though ceramics are certainly not the only line of evidence on which we should depend,
this evidence does argue for a significant decrease and even absence of Puebloan occupation in the Santa Cruz River basin during the late 15th and 16th centuries.

**Population Estimates for Prehistoric Occupation in the Study Area**

A major issue running through a number of reports associated with this case is the estimation of occupants in the Santa Cruz and Truchas watersheds, particularly prior to European occupation in the area beginning in the late 16th and early 17th centuries. This is an important topic, not only for the elucidation of when people were, and were not, in the watersheds but also because population estimates are a gauge of what land and water resource needs would have been through time. It is important to link potentially arable lands in the Santa Cruz River basin with the presence of prehistoric occupation of the region, hence it is imperative to carefully consider population levels, distribution, and associated land use features. Inaccurate population estimates become magnified when they serve as the basis for estimated resource requirements in any region of the world.

As is evident from the previous discussion, only general understandings of population distribution, as depicted by site location maps, can be derived from the ARMS site files. Any estimation of past population using the ARMS files is fraught with problems, the least of which is the uneven recording of site sizes throughout the database.

In this section I apply present archaeological standards for retrodicting past population levels in the Santa Cruz area. I also detail significant discrepancies in past population estimates for the study area, particularly with respect to temporal change in population levels. These discrepancies have resulted in a significant overestimation of indigenous populations in the study area by other researchers, due to both the lack of application of present estimation standards and the misinterpretation of site occupations in the study area.

Two assessments of precontact site size and population have been submitted in expert reports associated with this case, the first by Marshall and Walt (2007) and the second by Eiselt (2008). Marshall and Walt’s study presents a comprehensive summary of site occupations in the study area through time, summarized in Table II.1 along with estimated room counts for each of the major aggregated settlements in the Santa Cruz
study area. Room counts commonly used as a first step in estimating prehistoric population levels, and in their study Marshall and Walt do not extrapolate population estimates, though they do use the site summary data to discuss trends in settlement through time in the study area.

Eiselt (2008) uses Marshall and Walt’s site data for Coalition and Classic period occupations to estimate population for the Santa Cruz and Truchas watersheds, based on the total room estimates. Eiselt is not simply interested in population estimates per se since she, in turn, employs the numbers to assess claims for estimated arable land needs in the region.

Because both expert reports emphasize the links between prehistoric population levels and concomitant resource needs (land, water, etc.), we need to carefully assess the estimation techniques involved in going from the measurements of site size, to room counts, then to site population size, and finally to an overall estimate of how many people may have lived in the study area at any one time over the past millennium. Marshall and Walt’s translation from site size to number of rooms is relatively straightforward. Given that most of the surface room blocks that formed the primary residential structures during the Coalition and Classic periods were made of adobe, Marshall and Walt measured the extent of these melted adobe architectural units and divided the overall extent by 12 m², which is an approximation for the average size of a pueblo room (3x4 m) during these time periods. Though this is on the upper end of room sizes recorded elsewhere in the Rio Grande (Pot Creek Pueblo rooms average from 9.5 – 11.5 m² depending on occupation phase [Adler 1999]), it is a workable estimator.

Eiselt (2008) takes these room counts and provides a relatively thorough review of ethnographic and archaeological studies that have addressed how to translate architectural space to population estimates. The step from room count to human population remains a sticky endeavor. The two primary methods of estimating site population have been based upon either ethnographic data on average household size across cultures (Cook 1970; Hill 1970; Lightfoot 1992) or averages of domestic space used per person (Brown 1989; Casselberry 1972; Clarke 1971). In her study Eiselt relies on average amount of domestic floor space used per person, using estimates of 5.3 m² per person (Hill 1970) and 6 m² per person (Casselberry 1972). This provides an estimate of
the number of people who were housed in each settlement, assuming all roofed spaces were in use at the same time.

Eiselt correctly points out that archaeological and ethnographic studies have shown that ancestral Pueblo settlements were likely not fully occupied from beginning to end. She factors in three estimates of occupancy, 100%, 69% and 49%, and applies these occupancy estimates to the overall population for each settlement. Finally, Eiselt produces a population estimate for each of the large Coalition and Classic period sites in the study area, and sums these figures to derive an overall population count. Depending on the meters squared per person (5.3 – 6.0) and the occupancy rate, Eiselt’s population estimates for the Santa Cruz River basin range between 6,475 to 2,803 people. For the Truchas watershed her estimates are 776 to 332 people.

There are two major problems with this method of estimating prehistoric population. First, it assumes that each site assigned to a time period, which is determined by the types of pottery found on that site, is built and occupied during the entire time frame defined by the pottery found on the site. In other words, it equates the life span of each site to the entire life span of a certain ceramic style. So, for example, if Biscuit A ceramic type is manufactured for a century, every site containing that ceramic type is assumed to have been occupied for the entire century. Though Eiselt attempted to take site occupancy into account, that estimator is based on how many rooms may or may not be occupied at any given point in the site’s use life, and does not address the actual site use life span.

Second, this approach assumes that all settlements with a distinctive type of pottery are functionally equivalent. In other words, if there is architecture and pottery, the site was a habitation for a group of people pursuing the same lifestyles across a region. This is problematic in that there is abundant evidence that archaeological sites are not functionally homogeneous. Some settlements may have served as domestic villages, while other sites with the same ceramic signature may have been refuge sites used by these same villagers to avoid conflict during times they sought defense from enemies.

As a case in point, Tsigubú’ú Pueblo is one of the major archaeological sites that figures into the settlement pattern summaries by Marshall and Walt (2007) and Eiselt
(2008). Marshall and Walt assign a major population of ancestral Tewa to this settlement, interpreting it as a long-term occupation site in the Truchas drainage. My own visits to this site lead me to believe that this is a defensive site, and was very unlikely to have been occupied for any length of time. There is scant artifactual evidence on or around the base of the mesa on which the site is located. Defensive sites of this type are common in other regions, including the Kayenta and Mesa Verde regions, and most archaeologists contend that such sites are used only during times of danger and defense, and should not be considered to have been long-term village occupations that, in turn, are used in any population estimates. The village settlement may have housed people for generations, while the refuge site may have sheltered people for a matter of a few months. Yet if we assign uniform population estimates to both based on an assumed functional equivalence we will grossly overestimate the number of occupants in a region for that time period.

A more realistic population estimate needs to account for average residential space used, site occupation spans, site function and the duration of ceramic styles. In this report I rely on the more recent work of Brown (1987) who reanalyzed the data used by Naroll (1962), Casselberry (1972), Hill (1970) and others. Like Naroll, Brown relies on the dwelling floor area of habitations, which he defines as “the area under the roof of a dwelling for the members of a household in square meters (Brown 1987). He uses a 95% confidence interval from his study data, determining a population mean of between 4.7 m² - 7.5 m², with an average of. I use the 6.1 m² per person average in this report.

Eiselt’s reworking of Marshall and Walt’s site data does not address the estimated site use life of each site. Archaeological and ethnographic research focusing on this very issue of population estimation now show that significant overestimation of precontact population levels result from a misunderstanding of average site use life in the American Southwest. As noted above, both Marshall and Walt (2007) and Eiselt (2008) retrodict site size and Eiselt estimates population levels by assigning sites to ceramically-based chronological periods, which defaults to the assumption that each site was occupied for the entire span of that time period.

This is a problematic assumption since a number of studies in the American Southwest have established that site use life of prehistoric structures varied according to
the type of structure and the architectural components of the structure, and that site occupation spans are much shorter than most ceramically-defined time periods. For example, the earthen pit structure, the most permanent domestic architecture in the study area in the Developmental period, appears to have had a use-life of between 10 and 20 years (Cameron 1990; Gilman 1983). The rotting of wooden supporting beams, as well as insect infestation, may have been major factors in limiting the use-life of these early ancestral Pueblo pit structures.

The later reliance on load-bearing adobe and masonry walls in surface structures that appears during the late Developmental and early Coalition periods may have decreased the amount of decay prevalent in the use of support posts in subterranean structures, potentially increasing the use-life of the facilities. Comprehensive studies of tree-ring dated Pueblo occupation sites across the Southwest now show that average site use lives vary between 20 and 50 years, depending on the region and time period (Lightfoot 1992). What this means for this study is that rather than assigning settlement occupations to a time period lasting 100 or even 175 years, as assumed by Marshall and Walt (2007) and Eiselt (2008), we should be estimating site use life on much shorter time spans. In other words, even the largest of the settlements in the Santa Cruz River basin and surrounding areas were occupied for approximately two human generations, not for centuries or more.

Because the primary focus of this report is on the later, larger Coalition and Classic period settlements in the Santa Cruz River basin and surrounding area, I have utilized the upper boundary of estimated site use-life, 50 years, to give a more representative estimate of “momentary population” in the Santa Cruz River basin. Based on this average, we can assess “momentary population levels” for the study area, which is essentially how many people occupied an area at any one point in time during an archaeological period. Momentary population represents the state of the art in population estimation in southwestern archaeology since it provides a realistic measure of the population levels in a region and relatedly, what level of resource requirement would be necessary to support the needs of a regional population at any point in time.
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<tr>
<th>SITE</th>
<th>Roomblk size m²</th>
<th>Total Room Count</th>
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Table 7: Site Occupations & Population Estimates: Santa Cruz River Basin
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Table 8: Site Occupations and Population Estimates: Truchas Watershed

* this assumes Tsibugu’u Pueblo is a habitation site. I interpret this as a short-term defensive site, not a long-term occupation site.
Four important conclusions derive from this reworking of settlement distribution and size presented by Marshall and Walt (2007) and Eiselt (2008). First, the combined data from our reports shows that there is not a continuous occupation of the Santa Cruz and Truchas watersheds through time. Though population estimates are not possible to derive for the Developmental Period due to the lack of consistent settlement size data, there is a clear trend in population growth from the late Developmental period, through Coalition period occupation, reaching the population apogee during the Early to Middle Classic periods. Beginning in the middle to late 15th century, population levels plummet in the study areas. This population reduction is so significant that most, if not all of these two watersheds may have had no permanent village occupation after about AD 1450. As pointed out by Marshall and Walt (2007), this significant population reduction was due to the relocation of Ancestral Pueblo populations to large, aggregated villages located on or near the primary riverine systems of the Rio Grande, Rio Chama, and other major watersheds in the Rio Grande region.

Second, I have argued that previous reconstructions of prehistoric population levels in the region significantly overestimated occupation levels, as much as 300% above the estimates presented here. These overestimations are largely due to the misinterpretation of site use life, which for later prehistoric villages average only about 50 years. Assigning occupation spans to settlements based solely on the length of a ceramically-defined temporal phase overinflates the site use life, and hence the population levels, of that region.

Third, the review of sites and site records associated with this project reinforces the need for sets of consistent criteria for assessing site occupation spans, site function, and other important considerations involved in the process of going from data to interpretation. While temporal periods are generally agreed upon in the various expert reports, there is certainly significant variability in how site occupation span and site functions are assigned. The case of Tsigubú’ú Pueblo discussed above emphasizes the point that if we assign uniform population estimates to both based on an assumed functional equivalence we will grossly overestimate the number of occupants in a region for that time period. If Tsigubú’ú Pueblo served as a defensive site occupied for only
short periods of conflict, those people using this defensive redoubt live elsewhere in a different settlement. Counting that different settlement and Tsigubú’ù Pueblo as long-term village settlements results in a doubling of the actual number of occupants. This argues for the need to be conservative with population estimates for the study area.

Finally, the overestimation of population, along with the major changes in settlement and land use documented here, require a reassessment of the prehistoric subsistence systems that relied on the upland farming locations in the Santa Cruz and Truchas watersheds. Put simply, occupation of the area prior to AD 1450 relied on a variety of agricultural strategies, but it does not appear that there was any lack of arable land or need for intensive land use strategies in the area. Relatedly, given the likelihood that no village-based settlement strategy was being pursued in these upland watersheds after the middle of the 15th century, use of the area for food production would certainly have diminished simply because of the increased distance from the post-1450 riverine settlements in the region and the productive upland areas of the Santa Cruz and other secondary watersheds.

**Prehistoric Land Use Practices in the Santa Cruz and Truchas Watersheds**

Wozniak (1998) provides a thorough summary of research into prehistoric irrigation systems in the Rio Grande region, supporting earlier critiques of Cordell (1979; 1984) and Ansheutz (1994) arguing against claims for a significant reliance on irrigation systems by Ancestral Pueblo peoples. All of these scholars point out that the primary proponent for the widespread reliance on prehistoric irrigation was Florence Hawley Ellis, who spent most of her professional career working as an expert witness for Pueblo communities involved in water and land rights cases. Ellis based much of her arguments for prehistoric irrigation on her contention that the peoples of Chaco Canyon developed irrigation technology during the 10th-12th centuries (Ellis 1970, 1979) and “imported” the knowledge to the Rio Grande and other regions when they migrated out of the Chaco drainage in the late 12th century.

Wozniak’s review of reports of precontact (pre-1540) irrigation systems follows from the perspective that “in all discussions of irrigation systems of the potential for irrigation systems one must be extremely careful to distinguish between water or
erosion events. Historic reports of Puebloan agriculture (Hack 1942) observe that significant clearance of competing plants is a necessary part of the field preparation process, and subsequent weeding of fields keeps the plant cover to a minimum even on small, traditional field systems in the American Southwest. It is not only the need for moisture, but the need for light to moderate moisture, that ensures success in traditional farming systems. Too much moisture in a single episode, leading to the erosion of topsoil and field features, is one of the most pervasive problems that faced agrarian peoples in the region.

Given the likelihood that the remains of water channels at the site may have been the result of destructive episodes of erosion, and not the result of intentional channel excavations by prehistoric Puebloan farmers, the most we can conclude is that these ancestral fields were constructed with soil and water conservation features and not irrigation canals. These conservation features are ubiquitous across the study area, and their presence lends no additional support to claims of irrigation technology in the region.

In sum, the debate over the extent to which the purported diversion channels on the San Juan Airport site are cultural or natural is not an archaeological issue, but is a geomorphological issue. Geomorphological techniques need to be applied to these contexts to establish the degree to which these features might simply be the result of natural erosion and deposition episodes. If naturally-occurring processes can be ruled out through geomorphology, it is at that point that we can consider the involvement of anthropogenic processes at this site.

Tewa Ancestry and Cultural Affiliation in the Santa Cruz and Truchas Drainages

The cultural identity of prehistoric settlements in the Santa Cruz and Truchas drainages is a central issue that cross-cuts all of the ethnographic and archaeological reports in this court case. Cultural ties between archaeological sites, present day Native American communities, and associated water and land resources play a determining role in deciding the present and future rights to resources in the region. At the same time, those involved in these debates have to understand the difficulties of assigning cultural identities to long-past peoples, particularly when there is a significant reliance on archaeological and ethnographic data from the region. In this case, the various reports
associated with this case delve into the historical foundations of the Native American, Hispanic and later Anglo occupations in the Santa Cruz and Truchas watersheds. In this section I argue that assignments of cultural identity to archaeological sites and related resources made in various expert reports are generally based on scant or no archaeological lines of evidence and as such are problematic and potentially misleading.

Before going into the particulars of the arguments made in the various reports by Marshall and Walt, Ford and others, it is important to understand the present state of research relating cultural identity to archaeological remains. Any serious understanding of a social group’s identity rests in part on interpretations of the group’s origins. Central to these understandings of the past is the concept of cultural affiliation, which is defined as the historically traceable shared identity between known, modern tribes and identifiable groups of past peoples. Cultural affiliation is a major issue because several of the expert reports submitted as part of this case assume cultural affiliation between Ohkay Owingeh and archaeological sites, features and other resources in the Santa Cruz basin. This assumption is not supported through any explicit lines of archaeological evidence, these prehistoric settlements and features could be what remains from occupations of groups not directly ancestral to Ohkay Owingeh Pueblo.

Simply put, an argument of cultural affiliation requires a finding of ‘shared group identity’ between present-day groups and one or more identifiable groups in the past. The expert reports by Marshall and Walt (2007), Ford (2007) and Eiselt (2008) assume cultural affiliation, but do not provide archaeological evidence in support of there being past identifiable groups directly linked to the modern Pueblo. Though attempts to culturally affiliate present and past groups has been a focus of archaeologists in the American Southwest for well over a century (Bandelier 1890-92), there is presently only one legal statute that defines how determinations of cultural affiliation are established. The legal determination of cultural affiliation linking archaeological remains to present day indigenous groups was signed into federal law in 1990 with the passage of the Native American Graves Protection and Repatriation Act (NAGPRA). NAGPRA was enacted in large part as a legal avenue allowing Native American, Native Alaskan and Hawaiian groups to repatriate human remains, sacred objects, and items of cultural patrimony to the groups that have ties of cultural affiliation that link them to these remains and objects.
Under NAGPRA, a federally recognized tribe, Native Hawaiian organization or Native Alaskan corporation with the closest cultural affiliation to an item is entitled to control its ultimate disposition. In order to prove a claim of cultural affiliation, the statute identifies nine lines of potential evidence – geography, biology, archaeology, anthropology, linguistics, kinship, folklore, oral tradition, and history – as well as a tenth catch-all category defined as “other relevant information or expert opinion.” Thus any argument asserting ties of cultural affiliation between a past and present group should address as many of the nine major lines of evidence as are available and pertinent.

There is insufficient space to consider the entire corpus of ethnographic and oral historical evidence discussed in Marshall and Walt (2007) and Ford (2007), much of which addresses information from Harrington (1916) and others regarding use of the Santa Cruz River basin and the surrounding uplands by occupants of historic and present day Ohkay Owingeh. These discussions present lines of evidence commonly utilized in NAGPRA claims of cultural affiliation, and as such are certainly applicable to the present case. What is lacking from their otherwise comprehensive discussions are explicit material links from the archaeological record that clearly make a case for cultural affiliation ties between the sites, ceramics, agricultural features and other archaeological resources in the study area, and the community of Ohkay Owingeh. In addition, there is no evidence of irrigation or water diversion features from the archaeological record in their reports, and hence no argument proposed that the prehistoric ancestors of present day Ohkay Owingeh were utilizing the waters of the Santa Cruz River for irrigation. The only direct evidence discussed in support of Ohkay Owingeh cultural affiliation with the archaeological sites in the area is ceramics found on the settlements throughout the region. I address this issue of ceramic manufacture, cultural identity and cultural affiliation below.

**Ceramics and Identity During the Historic Period**

There is no question that temporally distinctive ceramic types were made and used by Hispanic settlers and indigenous Puebloan peoples throughout the historic period. These ceramic types (Table 9) have been recovered from archaeological contexts at historic Pueblo sites, including those with Spanish missions (Quarai, Abo, Pecos). The types have also been recovered at settlements founded and occupied primarily by
Hispanic families (La Puente, Trujillo House, etc.). For good reason, a significant amount of debate focuses on who made the pottery. Identifying sites to period of occupation is relatively straightforward since many of these types post-date European contact, but ascertaining the identity of those making and using the ceramic containers is a very complex issue. At the most basic level, archaeologists commonly assume that ceramic style is an indicator of potter's ethnic identity. Ethnicity, which we define as a self-conscious group identity that is most commonly defined through contrasts with other groups, can be asserted through many avenues, including material culture, language, geographic location, and belief systems. But there is also a long tradition of anthropological observation documenting the common lack of correspondence between ethnic identity and characteristics such as biological variation, language, religion, and technology (Boas 1940; Sapir 1921). So while it is clear that social groups can utilize constellations of these features to form and alter ethnic identity, the same sets of features are not always used to assert identity. Given the fluidity of how ethnic groups define themselves, we must be careful to document and test those contexts where we, as archaeologists, propose correlations between ethnic group and clearly defined material differences in the archaeological record.

Ceramic function is not of primary importance to this study, since we assume that the fragments of broken pottery recovered from an archaeological site represent the wares that were used and subsequently disposed of by the inhabitants. Ceramic manufacturing technology is of some importance to us in this study because if Hispanic villagers did make and use their own distinctive ceramic wares during the early occupation of the Santa Cruz area, these ceramic types could be useful differentiating early Hispanic settlements from historic Pueblo settlements. Of course, identifying a distinctive ceramic technology and the resulting material proxy for culturally Hispanic peoples assumes that there existed an asymmetry in ceramic exchange. In other words, distinctive Hispanic pottery would have to have been made and used only in Hispanic households, with no trade of Hispanic wares into historic Pueblo households. This asymmetry makes sense, since the larger Pueblo communities would have had sufficient potters to supply their own needs.
Identifying Culturally Hispanic Ceramic Wares

A recent review of the debate by Levine (1990) outlines the basic arguments for and against there having been a distinctive Hispanic ceramic tradition during the early historic period. One of the most outspoken critics of the existence of an identifiable Hispanic ceramic tradition is David Snow. He argues that among the predominant Historic ceramic types in northern New Mexico there is insufficient evidence of significant differences in ceramic composition, surface treatment, decoration, or vessel form to warrant an argument for two distinctive ceramic traditions. Snow (and others) also cite a range of historic accounts that describe the acquisition and use of Pueblo pottery by early historic Hispanic households and communities. Snow argues that the ceramics types included in the list were made, used, and exchanged primarily by Pueblo peoples during the early historic period (basically before 1800).

In contrast, Levine (1990) proposes the possibility of a technologically and ethnically separate Hispanic ceramic production tradition that began early in the historic period. Based on data from the sites of La Puente (LA54313) and Trujillo House (LA59658), Levine argues that differences in slips, surface treatment, decoration, and temper types indicate separate Hispanic and Pueblo ceramic traditions during the 16th-18th centuries in New Mexico (Table 9).

At this point in the debate, there is still insufficient evidence to assign ceramic manufacture of historic period ceramics to ethnically Pueblo or Spanish individuals or groups in the Santa Cruz River basin and surrounding areas. Even if sufficient evidence is documented in the future, we still have to face the problem that we are dealing with ceramics that were very likely to have been exchanged, purchased or somehow distributed for use outside of the original manufacturing location. So the recovery of a “Puebloan Ware” does not indicate where the pottery was made, but only where it was being used and was subsequently broken or deposited.
<table>
<thead>
<tr>
<th>WARE</th>
<th>TYPES</th>
<th>SLIP</th>
<th>SURFACE TREATMENT</th>
<th>DECORATION</th>
<th>TEMPER</th>
<th>GROUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tewa Black</td>
<td>Kapo Black; San Juan Black</td>
<td>Thick Black</td>
<td>Well Polished Slip, Interior and Exterior</td>
<td>None</td>
<td>Vitric Tuff, Pumice and Fine Sand</td>
<td>Pueblo</td>
</tr>
<tr>
<td>Tewa Red</td>
<td>San Juan R/T*; Tewa Red</td>
<td>Thick Red</td>
<td>Well Polished</td>
<td>Red Band of Slip only decoration</td>
<td>Vitric Tuff, Pumice and Fine Sand</td>
<td>Pueblo</td>
</tr>
<tr>
<td>Hispanic Black</td>
<td>Smudged Casitas</td>
<td>Thin</td>
<td>Poorly Polished</td>
<td>thin and of slip over rim into interior</td>
<td>Fine to medium sand, very rare pumice</td>
<td>Hispanic</td>
</tr>
<tr>
<td>Red Ware</td>
<td>Casitas Red-on-Brown</td>
<td>red slip, rag applied</td>
<td>Poorly Polished</td>
<td>Red Band over rim, into interior</td>
<td>Fine to medium sand, very rare pumice</td>
<td>Hispanic</td>
</tr>
</tbody>
</table>

Table 9: Expected Differences Between Historic Hispanic and Pueblo Wares, From Levine 1990 (*R/T = Red-on-Tan)

CONCLUSIONS

This report has detailed archaeological investigations in and around the Santa Cruz River basin conducted as part of the New Mexico v. Abbott case. Several research goals framed these investigations, including:

1. An examination of any reported pre- and post-contact archaeological sites in the Santa Cruz River basin and its immediate bordering uplands,
2. A critical review of archaeological site file data available in the New Mexico state ARMS (Archaeological Resource Management System) for both prehistoric and historic sites in the Santa Cruz River basin.
3. A critical review of past research assessments of settlement and land use strategies utilized by ancestral and historic Native American populations, as well as by later European populations, in the region.
4. A review of recent research that assigns cultural group identity to archaeological remains in the Santa Cruz area.
5. A critical review of archaeological evidence of purported prehistoric water
diversion features, irrigation and other water use strategies in the Santa Cruz area.

My review of the existing archaeological data on file with the State of New
Mexico documents a relatively low site density in the study area. Reasons for this low
site density may include significant differences in prehistoric occupation of the area, as
well as site visibility issues. The largest and most visible sites have clearly been given
the largest amount of attention in the study area, understandable given the spotty
coverage with respect to archaeological survey in the Santa Cruz river valley proper.
This means that some smaller, less obtrusive settlements may yet to be recorded in the
survey area. Given that later prehistoric and historic Pueblo villages were significantly
larger than early historic (A.D. 1540-1700) Hispanic settlements throughout the area,
eyear Hispanic settlements are probably underrepresented in the sample of sites presently
listed in the ARMS files.

At the same time, there is a significant record of Puebloan occupation in the study
area, primarily during the late Coalition and early Classic temporal phases
(approximately AD 1250-1425). Several large Ancestral Pueblo villages were built and
occupied during this time period, nearly all of which were visited and studied as part of
this research. Population estimates of the number of Puebloan occupants in the Santa
Cruz River basin and surrounding areas have been proposed by other researchers
associated with this case (Eiselt 2008). Based on reanalysis of these estimates, as well as
reinterpretations of the functions of some of the settlements, there has been a significant
overestimation of prehistoric occupation in the study area.

In addition to the aforementioned problem of population overestimates, recent
expert research has also failed to emphasize the lack of evidence for Ancestral Pueblo
village occupation in the study area during the middle to late Classic periods,
approximately AD 1425-1540. Beginning in the 15th century, population levels plummet
in the study areas. This population reduction is so significant that most, if not all of these
two watersheds may have had no permanent village occupation after about AD 1450.
Throughout the Santa Cruz River Basin there is a dearth of ceramic and settlement
evidence for village occupation. There is no unequivocal evidence for Ancestral Pueblo
occupation of the Santa Cruz River Basin for about 150 years, between AD 1450-16000. As pointed out by Marshall and Walt (2007), this significant population reduction was due to the relocation of Ancestral Pueblo populations to large, aggregated villages located on or near the primary riverine systems of the Rio Grande, Rio Chama, and other major watersheds in the Rio Grande region. This move out of upland locations, including the Santa Cruz River basin, has been documented in other areas throughout the northern Rio Grande (Stuart and Gauthier 1981) and represents a significant reorientation of settlement and subsistence strategies to lowland contexts. Ceramics recovered in surface surveys and excavations in the Santa Cruz basin reflect this probable hiatus in occupation during the late 15th and early 16th centuries, with a near absence of material evidence datable to this time span. In fact, the primary ceramic evidence for occupations in this time period comes from undecorated culinary wares, all of which have problematic time spans assigned to their manufactures. After 1600 the archaeological evidence is all from Spanish settlements spread throughout the Santa Cruz River Basin.

This report also critiques recent assertions that the archaeological remains found in the study area are culturally affiliated with the present day Pueblo communities such as Ohkay Owingeh, Nambe and others. Cultural affiliation, defined as the historically traceable shared identity between known, modern tribes and identifiable groups of past peoples, requires the identification of both present and past group identity through a variety of lines of evidence. The standard lines of evidence as defined in the Native American Graves Protection and Repatriation Act (NAGPRA) include geography, biology, archaeology, anthropology, linguistics, kinship, folklore, oral tradition, and history. While significant amounts of archaeological research has been conducted by a range of experts associated with this case, thus far no one has shown any clear lines of archaeological evidence that ties one or more of the present day Pueblo communities to the archaeological sites or remains in the study area. There are arguments made for cultural affiliation based on ethnographic, oral historical and geographical information, but the archaeological record still shows only general linkages between the Ancestral Pueblo remains in the region and the historic Pueblos in the northern Rio Grande.

While the role of archaeology in the assertion of cultural affiliation to specific Pueblo communities remains vague, expert reports associated with this case have made
very specific claims for prehistoric water control strategies, including irrigation through the diversion of runoff water into artificially created canals and rock alignments. Specifically, block excavations at a series of archaeological sites near the San Juan airport argue for the use of water diversion ditches to carry runoff moisture to agricultural field areas. These claims do not provide geomorphological evidence that allows us to assess whether these ditches are in fact anthropogenic or are the result of natural erosion and down-cutting in these field feature locations. Extensive evidence of arroyo-cutting and erosion exists across the alluvial fan on which these purported field and water diversion features rest, bringing into question how one can differentiate cultural and natural forces of land modification. At this point there is no unequivocal evidence for diversion canal irrigation in or around the Santa Cruz basin during the prehistoric occupation of the region.

In summation, archaeological evidence for prehistoric human strategies of land use are wide-spread across the Santa Cruz River basin and adjoining areas. These remains, as well as the evidence for historic use of this region, remain ambiguous on the questions of cultural identity, active use of irrigation canal technology, and to whom associated water rights, if any, should be conferred based on these criteria.