The School of Anthropology and Arizona State Museum, University of Arizona, are seeking supplemental funding to support a fieldschool at the Rock Art Ranch (RAR) about 15 miles southeast of Winslow in northeastern Arizona. Based on the famous and thoroughly documented petroglyph site after which it is named, Rock Art Ranch and adjoining ranches are known to have an archaeological record that spans at least 8000 years, yet no archaeological research has been conducted on any of these private ranches that covers 100,000s of acres. The UA fieldschool will begin its first summer field season in 2011 focused on conducting an intensive archaeological survey that will cover at least 10,000 acres over three field seasons. The goal of the survey is to collect detailed information about past human use of the region and how it is connected to the extensive petroglyphs panels in adjacent Chevelon Canyon. Each site will be thoroughly documented, mapped, inventoried with respect to environmental information and a collection of artifacts will be made. Research conducted in areas surrounding RAR suggests the region has consistently been a border region to stronger cultural patterns to the east, west, and north and relations with these regions have varied through time. To understand the potential responses to this situation within groups occupying RAR, four models explaining prehispanic settlements patterns will be evaluated using the RAR data. These models have been used by researchers working in surrounding areas to explain their data. Briefly, these are the frontier model, risk management model, population circulation model, and conflict model. Settlement and material culture patterns predicted by these four models will be compared to the actual data recovered by the field school to assess their explanatory power. It is quite possible that different models will better explain patterns at different points in time.

Perhaps the broadest impact of the proposed research is its application to border regions in today’s world, which are places of tension, contention, and mixed identity. The proposed research will evaluate what it means to live in an area in the past with similar conditions. Research into areas in the past where groups faced similar conditions will inform on today’s situation. Another broad impact is the use of the fieldschool to train students in field methods, field research, the application of archaeological science to field archaeology, and the importance of traditional knowledge to understanding the archaeological record and how these tools can be applied to areas throughout the world where similar conditions exist. Traditional knowledge will be provided by elders from several adjacent tribes who will participate in mentoring and training fieldschool students in ways to view the present and past differently than through western science. Thus, the research program will train students about the relevance of archaeology to understanding present and persistent human conditions. Another impact is working with local ranchers to develop preservation and interpretation plans. The family who owns RAR is already fully involved in Cultural Tourism, hence the name Rock Art Ranch. The goal of this family is to better understand the archaeological context of their ranch as it relates to the petroglyphs in the canyon and to past land use practices. This understanding will be used to enhance visitor experiences on the ranch and thus preservation of the sites and information are of high priority. Ultimately, the goal is to create a regional understanding of the history of occupation and use of the southern Colorado Plateau.

The intellectual merit of the proposed activity is that it takes place in an area with no prior archaeological research except the study of petroglyphs, so the contribution of new knowledge will be significant. Just as importantly, the project expects to link the archaeological record to the petroglyphs panels that span 8000 years. Comparing the archaeological record to the petroglyphs will improve our ability to identify and distinguish groups occupying the area, especially pre-ceramic groups, and date the petroglyphs panels. The results will be compared to and integrated with existing knowledge in adjacent regions with the goal of providing a broad understanding of the spatial and cultural relationships of groups occupying the study area and adjacent regions while evaluating various regional research models. The project will also use GIS to compare cultural patterns to topographic and environmental variables – plant communities, soil types, and geology. In these ways, the models can be tested for their efficacy in explaining the archaeological record. Because research in archaeology in the Southwest U.S. and elsewhere tends to focus on the major cultural traditions, defining border areas more in terms of what they are not rather than what they are, it is important to balance our perspective of the past with research into areas where identity was more nuanced and the importance of persistence was focused on the household within a small community.
Introduction and Background

For the past 70 years, the middle Little Colorado River valley (MLCRV) in northeastern Arizona has been viewed as a major boundary to archaeological cultural traditions (Colton 1939; Gumerman 1969; Reid and Doyel 1986:map on inside cover ; Solometo 2004; Wendorf 1953; Wilson 1967, 1969) (Figure 1). Differences in material culture, specifically pottery show that within the MLCRV there is enormous diversity of material culture, associated with strong boundaries. I have worked in this region for 35 years and have contributed to a growing knowledge base (Adams 2002; Lange 1998). There is no lack of studies that provide examples of the diversity, although much of this research remains unpublished (Colton 1939; Douglass 1990; Gumerman 1988; Gumerman and Skinner 1968; Herr 2001; Lange 1998; Plog and Hill 1976; Solometo 2004; Wilson 1969).

NSF is being asked to fund a research project whose goals are to conduct an archaeological survey of 16,000 acres in an area where no previous archaeological work has been done, with the exception of the documentation of a major rock art site in Chevelon Canyon (Malotki 2007; Weaver 1993). Research will be conducted on two adjacent ranches: Rock Art Ranch (RAR) and property to the south of RAR owned by Aztec Land and Cattle Company (Aztec). The objectives of the research are to document the archaeological record of the area and to place it within the context of the broader archaeological record of the region. The last synthesis of the MLCRV by Gumerman and Skinner (1968) covered the area where Little Colorado White Ware was predominant, or north of the Little Colorado River, and a new synthesis is long overdue. Equally important is to bring an anthropological perspective to the study area by evaluating several models that consider how humans adapt to new landscapes in frontier or borderland areas (Douglass 1990; Herr 2001; Schachner 2007; Solometo 2004). These studies used survey data from regions within 150 km of the proposed study area.

This study will have the advantage of recent research and CRM projects, summarized by Douglass (1990) Herr (2001), Solometo (2004), and Wilson (1969), that have helped clarify details of regional archaeological research. The previous studies have created extensive data that provide evidence supporting models of what occurs in borderlands areas. Using these studies will make it possible to put the proposed research area into sharper focus as to how the archaeological record is similar to or varies from nearby areas. Unpublished research documenting extensive pre-ceramic occupation adjacent to the study area (Huckell and Huckell 2004) and decorative styles in the Chevelon Rock Art panel (Malotki 2007; Weaver 1993) suggest there is a detailed and lengthy occupation of the study area that extends 6000 years prior to the initiation of the ceramic period about A.D. 400-500. The opportunity to tie the archaeological record to glyphs and decorative rock art styles in Chevelon Canyon will contribute meaning and understanding to the survey data. By the late 1500s, non-Pueblo groups were in the area and documentation of their archaeological remains will contribute to our knowledge of their presence and use of the area (Hammond and Rey 1929, 1966; Wilson 1967). A survey of the study area will focus on the landscape in which the archaeological record exists (Zedeño and Bowser 2009). To gain added insight into how this landscape may have been used, Hopi, Zuni, Navajo, and Apache consultants will be invited to visit and comment.

Support from NSF will augment funds generated by a University of Arizona, School of Anthropology (UASA) summer field school. Funds will be used to support analysis of data collected by the fieldschool including sourcing pottery and obsidian. Additionally, the funds will support use of specialized equipment for survey, to support participation by two Native American students on the project, for native consultation travel and fees, and travel and fees for lecturers to the fieldschool.

Description of Physical Environment, Cultural Traditions, and Chronology of the Region

Physical Environment

The study area lies within the Little Colorado River Basin, which covers 69,827 sq km of which 56,118 sq km lie in Arizona (Lange 1998:1). The physiology of the Basin is defined by a major uplift that created the Colorado Plateau and redirected the flow of the Little Colorado River (LCR) to its present course. This resulted in three major environmental provinces: 1) areas to the south of the LCR, ending at the Mogollon Rim, heavily forested with pine and fir at higher elevations and pinyon-juniper (p-j) at
lower elevations. This area is deeply dissected by narrow canyons with spring-fed permanent flow and has more moisture than the rest of the basin; 2) an arid region to the north of the LCR that is dominated by sedimentary sandstones and clays creating broad, dissected valleys with little to no permanent water other than springs and higher mesas that are lightly forested with p-j, and rainfall generally less than 300 mm/year; and 3) the LCR floodplain, which can reach a width of nearly 5 km that was dominated by cottonwood with willow and New Mexico olive bushes, has a permanent flow only in intermittent areas, for example a 30 km stretch from Chevelon Canyon to north of Winslow with annual precipitation less than 350 mm (14 in) below 6000 ft (1830 m) and more than 350 mm above 6000 ft. The area north of the LCR valley is classified by archaeologists as inhabited by Ancestral Pueblo groups for at least 2000 years. In contrast, the area south of the valley is typically classified as Mogollon Culture, while the valley itself is seen as a boundary between these two archaeological traditions. Precipitation and growing season are strongly correlated to elevation.

A two-day vehicular survey of the study area provided a preliminary evaluation of the distribution of archaeological sites and habitats. The study area lies at the northern end of the Mogollon Rim province within 6 km of the LCR floodplain (Figure 1) and lies at the transition between the two areas. The western boundary of the study area is Chevelon Canyon, a deeply incised canyon ranging from 25-50 m deep and 50-100 m wide with permanent water fed by multiple springs. The canyon cuts through the Coconino Sandstone its entire depth making sand the dominant soil type in the study area. The eastern boundary of the study area is McDonald Canyon, another incised canyon that drains the Mogollon Rim, although at 20 m is not as deep as Chevelon. The south end of the study area is defined by the highly eroded uplands of Coconino SS bedrock. Based on long-term averages from weather stations at Winslow and Holbrook, the growing season in the study area should be 160-170 days and annual precipitation should total 230 mm (9
in) (Adams 1979). Total area to be surveyed is 65 sq km (25 sq mi) or about 16,000 acres averaging 10 km (6.2 mi) east-west and 6.5 km (4 mi) north-south.

Within the study area there are seven identified habitats that are expected to affect settlement.

1. Chevelon Canyon: This narrow corridor has water, riparian vegetation and minimal soils suitable for farming and accounts for 5% of the study area. Petroglyphs sites concentrate in the canyon.

2. Bell Cow and Chimney Canyon: These shallow, side drainages to Chevelon Canyon have seasonal flows of water, cottonwood and juniper with broad alluvial soils suitable for farming. These canyons occur in the western third of the area and account for 10% of the overall study area. Settlements appear to concentrate along the edges of the canyons.

3. Chimney Draw: The northern end of Chimney Canyon grows quite shallow and eventually ends, depositing its soils in broad alluvial flats on the north end of the study area. Settlement seems densest in this area, which account for 10% of the study area.

4. Upland Sand Dunes: Ridges of deep, expansive sand dunes occur among various canyons in the western third of the study area and account for 10% of the area. Earlier settlements using pit house architecture appear to concentrate in these areas.

5. Upland Coconino SS Bedrock: Soils are shallow to nonexistent with stands of juniper common. This type is typical of the southwest portion of the study area and accounts for 10% of the area.

6. Shallow Upland Soils: Exposed upland areas are subject to strong seasonal winds that remove topsoil. This area also has numerous shallow washes that further erode surface soils, exposing hardpan with gravels. This habitat is typical of the southern and eastern third of the study area occupying 30% of the area.

7. Lowland Sand Dunes: The topsoil removed from the uplands is deposited in lowland areas to the north and covers 25% of the study area. This area has not been explored.

Use and occupation of these seven habitats should be related to the nature of the subsistence. Groups practicing horticulture concentrate in areas with good farming potential; groups not practicing farming choose areas with other subsistence priorities, such as wild plant diversity and trees for shelter. Deviation from these expectations could be the result of a need for security caused by social tension or conflict resulting from living in a border region. Thus, results of the survey will be evaluated against multiple models of settlement history and social process.

Cultural Traditions

Multiple archaeologically defined cultural traditions used areas around the study area and likely used the study area as well. These are grouped by subsistence base and time period.

Pre-agricultural: This includes Paleoindian and Archaic traditions documented in the region by numerous researchers (Agenbroad 1967; Bartlett 1943; Briuer 1977; Burton 1991; Burton and Farrell 1993; Danson 1961; Gumerman 1988; Huckell and Huckell 2004; Sims and Daniel 1967; Tagg 1994; Wendorf and Thomas 1951). Remains occur as lithic scatters with diagnostic technology and projectile points. There should be no surface remains of architecture.

Agricultural: This includes Pre-ceramic or Early Agricultural groups, Ancestral Pueblo or Anasazi groups, and Mogollon groups (Burton 1991, 1993; Colton 1939; Douglass 1987; Gumerman 1988; Gumerman and Skinner 1968; Jones 1986, 1987, 1993; Lange 1998; Van West 1994b; Wendorf 1948, 1950, 1951, 1953; Wilson 1967, 1969; Young 1996). Remains from this period are variable. The absence of ceramics, location near arable land, and presence of ground stone will identify Early Agricultural groups. Brown ware pottery is associated with Mogollon culture. White decorated and gray plain wares are associated with Ancestral Pueblo culture. Wilson (1967, 1969) defined the boundary to the Sinagua cultural tradition as west of Clear Creek, 20 km west of the study area. The only Sinagua material culture in the study area will be pottery. The presence of these pottery traditions can be caused by settlement or exchange. Was there co-residence, sequential use, or exchange between Mogollon and Pueblo groups?

Post-Pueblo/Historic: This includes Apachean or Yavapai groups postdating 1400, when Pueblo groups left the study area and adjacent region (Adams 2002; Hammond and Rey 1929, 1966) as well as evidence
of early ranching dating to the late 1800s (Carlock 1994). Sketchy historical records indicate use of the area by Yavapai or Apache involved hunting and gathering rather than farming. Lithic scatters with distinctive technology, possibly distinctive ceramics in form and color, and possibly historic Anglo-American culture items will define Apache and Yavapai sites. Sites related to livestock with late 19th century material culture will define early ranching sites.

**Chronology**

Table 1 lists the chronology and cultural traditions expected in the study area based on previous research in adjacent areas. The ceramic portion of the farming sequence is dominated by tree-ring dated ceramic traditions from two regions of the Colorado Plateau, Tusayan and Little Colorado traditions north of the study area and the Cibola tradition east of the study area. The sequences are structured primarily around black-on-white decorated ceramics. The interplay of these ceramic traditions in surrounding areas is at the core of models explaining movement and exchange between these areas.

**Previous Research**

No research has been conducted in the proposed study area. However, extensive work in surrounding regions will help clarify what we expect to see. The focus is on projects that include large survey areas supplemented by excavation.

**Hopi Buttes/Little Colorado River:**

*Gumerman* (1969, 1988; Gumerman and Skinner 1968): George Gumerman did dissertation research on the poorly understood Hopi Buttes area combining survey of 25 sq mi with excavation of seven sites (Gumerman 1969, 1988). This work was combined with excavations on five sites conducted by Alan Skinner (1968:185) along the Interstate 40 corridor 50 km east of the study area. This research defined the Winslow Branch of the Ancestral Pueblo tradition based on production of a distinctive decorated pottery named Little Colorado White Ware (LCWW). Production of LCWW was centered in the Hopi Buttes, a volcanic field located between the LCR and Hopi mesas (Douglass 1987). Within this area all settlements had decorated ceramic assemblages consisting of nearly 100% LCWW between 1075 and 1250. This decorated pottery tradition is associated with the distinctive environment of the region, which is extremely arid with few springs and ranges in altitude from 4500-6200 ft. Juniper is found on the highest elevations in an area dominated by Great Basin Desert Province vegetation (Gumerman 1969). The only exception is the LCR, which was too unpredictable to try to farm regularly (Lange 1998; Van West 1994b).

Gumerman and Skinner (1968) also described the extensive history of the Hopi Buttes region prior to the introduction of LCWW. Basketmaker II sites, which date to about A.D. 100, are still quite rare in the Hopi Buttes region and are not particularly distinctive from settlements to the north or east. Also poorly known are the Early Agricultural and Archaic traditions in the Hopi Buttes. The Tusayan branch of Ancestral Pueblo culture was the dominant tradition in the Hopi Buttes region beginning in Basketmaker III, dating from about A.D. 500 to the mid-1000s.

*Douglass* (1987): Amy Douglass conducted her dissertation research in the same region, focusing on production and exchange of LCWW. Despite Gumerman’s definition of the area of pure LCWW as focused in the Hopi Buttes, sites having pure LCWW occur in the Flagstaff region on Sinagua sites and in the canyon country north of the Mogollon Rim, many miles outside the areas defined by Gumerman. Many researchers claimed that LCWW was manufactured in these areas, so the focus of Douglass’s research was to identify the production area for the ware and where, when, and why it was exchanged. Using X-ray diffraction and electron microprobe analysis, Douglass determined that production of LCWW was restricted to the NE portion of the Hopi Buttes (Figure 1) and that directional long distance exchange explained its occurrence outside the production area (Douglass 1987:225-26). She (1987:259-61) determined that LCWW in the Mogollon Region along Chevelon and Clear Creek canyons south of the study area, was the product of direct exchange. She noted that sites with the highest percentages often had public architecture and sites close to one another had different frequencies of LCWW (1987:257, 263). Exchange also increased after 1130 when Walnut B/w was produced. Douglass (1987:271-72) attributes the intensive, long-distance exchange to social groups trading across environmental and cultural
boundaries as a means to minimize the risk of gaining access to resources not available in the area of production, an idea first proposed by Plog (1980:133).

**Lange** (1998): Richard Lange conducted a 30 sq mi. survey of the Homol’ovi Ruins State Park and adjoining areas on both sides of the LCR floodplain as part of the Arizona State Museum’s (ASM) long-term study of the Pueblo IV Homol’ovi Settlement Cluster (HSC) (Figure 1). Lange and Van West (1994, 1996) proposed that multiple short-term occupations of pit house villages along the LCR correspond to stream flow in the river and precipitation patterns in the region. The pattern recurred from the early 600s to the early 1200s. This pattern of short-term settlement was confirmed by excavations conducted by Lisa Young (1996). For the 600-1050 period, the occupants used Tusayan White Ware (TWW), but from 1050-1230 they used LCWW. These occupants were migrating from the Hopi Buttes to the edges of the LCR floodplain during periods of drought and low stream flow. Major occupations occurred from 620-780, 820-890, 1000-1050, 1120-1225, and 1260-1400 (Lange 1998: 44, 147-161). Throughout these occupations, the dominant ceramics came from the north, from the Hopi Buttes and Black Mesa with Sinagua ceramics (Alameda Brown Ware,) comprising 8.6% and Mogollon Brown Ware a similar 7.6% (Lange 1998). Both brown ware traditions were common prior to 900 and after 1120.

**Upper Chevelon and Clear Creek Canyons**

**Solometo** (2001, 2004): Julie Solometo focused her dissertation work on data gathered from long-term research by UCLA from 1971-1974 (Plog et al. 1976) and the University of Virginia under the guidance of Steven Plog beginning in 1997 (Solometo 2004). The original Chevelon Archaeological Research Project (CARP) focused its research 20-30 km south of the study area east of Chevelon Canyon on Apache- Sitgreaves National Forest land (Figure 1). An intensive survey project covered 65 sq km, recording over 1000 sites, and was complemented by excavation of 24 sites. CARP II centered its research farther to the west of CARP to evaluate and test sites along Chevelon and Clear Creek canyons, focusing on what Solometo (2001, 2004) terms tactical settlements or those that are defensive due to remote or inaccessible locations complemented by walls constructed to further limit access. CARP II recorded an additional 264 sites with excavations of four sites (Solometo 2004:169). The CARP study areas are dominated by pinyon-juniper (P-J) at an elevation of 6200-6700 ft.

Solometo (2004:207-11) presents the chronology as follows: Archaic: 7600-1000 BC, whose remains are focused in rock shelters in deep canyons and likely exploited patches having high plant diversity (Briuer 1977). Pre-Ceramic, Early Agricultural (BMII on Plateau: 1000 BC-A.D. 500) remains are focused in the canyon and along its edges. Abundant ground stone is found in association with small arable patches of alluvial soils, suggesting early experimentation with maize (Briuer 1977:29). Solometo (2004:201) defined five ceramic time periods: 500-1000, 1000-1100, 1100-1150, 1150-1250, 1250-1320. From 500-1000 ceramic-producing, farming groups moved away from the canyons and their flood-prone patches and began farming on secondary and tertiary drainages in P-J forests focused on Moenkopi SS-derived soils. They constructed check dams and terraces to enhance these farm plots. Throughout the period these groups used brown wares for cooking and storage and traded for TWW with groups to the north. From 500-850 they traded for Lino B/g from the north and Alameda BW from Sinagua groups to the west. From 850-1000 or a little later, they built pit house villages and traded for Kana-a B/w from the north and Alameda BW from the west. From 1000-1150 masonry dwellings were built, some with great kivas and rectangular enclosures. TWW and LCWW were exchanged into the area with some sites having Cibola WW (CWW). To the east of Chevelon Canyon, CWW was dominant after 1100 while LCWW was dominant elsewhere to Clear Creek Canyon. This was the period of highest population with many sites burned at abandonment. The typical site had 1-3 large rooms organized in a U-shape, suggesting occupation by a single family. Some sites have circular or square great kivas, which were the focus of these dispersed communities. From 1150-1250 the settlement pattern shifted back to the deep canyons where the sites are heavily fortified or near fortifications. The sites are dominated by Walnut B/w, a LCWW. There is no indication of occupation away from the aggregated pueblos near the canyons. The settlements also moved north for better defensible locations where it is more open, drier, and warmer. On the west side of Clear Creek Canyon are defensive sites dominated by Sinagua BW (Wilson 1967).
Average site size during this period is 12-15 households, five times the size of the previous period. Solometo (2004:275) identifies four tactical site types: forts, proximate refuges, isolated refuges and defensive habitations. From 1250-1320 the aggregated pueblos continue but are relocated away from the canyons and back to the pre-1150 locations. The ceramics are CWW types. The pueblos have large room blocks, more variable architecture, rectangular community rooms and possibly small square kivas. Many are burned. Occupation of the area ended about 1300-1320.

Chollo Project (Reid 1982): The Cholla Project conducted by ASM in the late 1970s was to mitigate the effects on archaeological sites of the construction of a transmission line from the Cholla power plant just east of Joseph City to Phoenix. Mitigation along the Chevelon Canyon portion resulted in excavation of 14 sites just west of the CARP survey, and 20-25 km south of the proposed study area. The sites are located in P-J at elevations ranging from 6400-6900 ft. Sites were fewer than 15 rooms, dating from 850-1275. The Cholla Project research confirmed the patterns defined above by Solometo. Sites prior to 1100 were dominated by TWW with LCWW dominant from 1100-1150 and CWW after 1250. There was an occupational hiatus from 1150-1250 signified by the complete absence of Walnut B/w at any of the sites, when, according to Solometo (2004), settlements clustered along the rims of the canyons.

Research within a 15 Km radius of the Study Area

Andrews (1982): Mike Andrews surveyed land around and south of Chevelon Pueblo on the west side of Chevelon Canyon and south of the LCR. The survey is 5 km north of the study area at an elevation of 4900-5000 ft. The entire area is grasslands. Thirty-one sites were documented ranging from BMIII to PIV. The sites are dominated by TWW until 1050-1100 when LCWW is invented and completely replaces TWW. No CWW is present. Walnut B/w is the most common type dating most of the settlements to 1120-1225. The area is densely settled and used due to the proximity of permanent water in Chevelon Canyon and abundant arable land at the confluence of Chevelon Creek with the LCR. An almost identical survey was done to the east of Chevelon Creek and south from its confluence with the LCR on Arizona Game and Fish Department land (Moses 2008). As with the Andrews study, the area is dominated by grasslands and sand dunes with several small pit house villages predating 1100 and small pueblos dating to the Walnut Phase.

Huckell and Huckell (2004): In the mid 1990s as part of research by ASM, Bruce and Lisa Huckell did a small survey west of Chevelon Canyon area and excavated an Early Agricultural pit house at God’s Pocket, a small side canyon to Chevelon Canyon. The excavations revealed a shallow pit house and exterior work areas. A maize cob was radiocarbon dated to a calibrated age of 2600+/-65 BP. The survey recorded more than a dozen deflated middle and Late Archaic, Early Agricultural, and BMII sites, most with diagnostic spear points, with considerable ashy deposits, suggesting lengthy occupation. Petroglyphs in Chevelon Canyon cover a similar span of occupation through the ceramic period.

Wilson (1967, 1969): In the mid1960s, John Wilson conducted extensive archaeological survey of Anderson Mesa to McDonald Canyon to determine the eastern boundary of the Sinagua, which Colton (1946) originally defined. Wilson also visited areas around Meteor Crater, Clear Creek, Upper Canyon Diablo, and Heber all more than 30 km from the study area. He recorded a total of 92 sites and noted the following boundaries based on ceramics. Alameda BW associated with Sinagua does not extend east of Clear Creek. Mogollon BW does not extend west of Clear Creek. Mogollon Corrugated BW, which postdates 1100, and Cibola WW do not extend west of Clear Creek and Chevelon respectively. According to Wilson, sites were scarce between Chevelon and Clear Creek in the region 40 km south of RAR. This boundary was also observed by Solometo (2004). The sites in the vicinity of McDonald Canyon are of particular interest to the proposed research, although his survey area is 14 km south of RAR. The area is geographically similar to RAR with a canyon, tributary washes, sandy soils and sparse juniper vegetation. Wilson (1969: Figure 2) recorded several small pueblos ranging from 2-20 rooms dating 1100-1300, all dominated by Mogollon BW. He (Wilson 1969:160) also noted that the McDonald Canyon area was unique in having numerous sites predating 1100, all pit house villages located in the deeper sandy soils of the area. Settlements were concentrated in upland areas and along the canyon and its tributary washes, similar to RAR (Wilson 1969:166).
Adams (2002, 2007): The PI has conducted excavations at five of the seven pueblos in the Homol’ovi Settlement Cluster since 1985 with work at Chevelon Pueblo closest to RAR (6 km to the north). Chevelon was occupied from 1290-1400 and consists of 500 rooms. There are remains of two earlier settlements beneath and beside Chevelon Pueblo, one with abundant Lino GW the other with abundant Walnut B/w. No features from either occupation were excavated. Ceramics from the PIV component are dominated by polychromes or red-slipped bichromes and northern corrugated wares, especially Tusayan GW and the later Awatovi Yellow Ware (Cutright-Smith 2007). Mogollon and Alameda BW are exceedingly rare and obvious trade items. These ceramics and religious and domestic architecture of the village point to the vast majority of its founders and occupants as migrants from the north (Adams 2002).

Rock Art Ranch
In June 2010 the PI and two colleagues visited Rock Art Ranch (RAR) and were taken by the owner, Brantley Baird, to visit 10 sites. During our visit we documented the geology and distinctive habitats, produced sketch maps of the sites, field recorded ceramics visible on the surface, and visited new areas where another site was found. The 11 sites include two pueblos dating 1125-1250 with 20+ rooms and 4+ rooms; one small pueblo dating 1075-1150; one possible pueblo dating 1000-1100; one small pueblo dating 1100-1250; five pit house villages dating 500-800 with two having components dating 800-1000; and, one pre-ceramic lithic scatter. One of the 500-1000 sites is quite large covering more than an acre. A twelfth site, the famous rock art panels within Chevelon Canyon have also been documented (Malotki 2007; Weaver 1993). The petroglyphs site contains more than 2000 glyphs located on both sides of the canyon for a distance of 500 m. Weaver (1993) recorded all of the glyphs with assistance from the Arizona Archaeological Society.

Location: The initial site inventory on RAR suggests sites will be concentrated in three of the seven habitat areas: upland sand dunes; within or along upper drainages; and associated with Chimney Draw. The lower sand dune areas have not been investigated and are also expected to yield sites. Petroglyphs sites are expected to concentrate in Chevelon Canyon.

Additional Survey/Excavation Work
In addition to the studies above, many survey and limited excavation projects to mitigate various land use activities have taken place within the broader scope of the region (Bradley and Ferg 1981; Dosh 1995, 1996; Gregory 1990a, 1990b, 1991, 1992; and Hokanson et al. 1997). Most of this work has taken place on federal lands south of RAR and are summarized by Solometo (2004: Figure 5.7). These projects clarify and support the broader trends and conclusions presented by the projects previously summarized.

Gaps in our Knowledge
The proposed study area lies in the middle of the regions detailed in the preceding section. There is a gap in archaeological knowledge along a significant portion of the north end of the deep and narrow canyons that originate on the Mogollon Rim just before intersecting the LCR. This area lies at the intersection of multiple archaeological cultural traditions that vary through time and space. In modern archaeological parlance, the RAR study area lies on the border or frontier of well-defined archaeological traditions whose centers lie 50 km or more away. To the west are the Sinagua, centered in the Flagstaff area and Verde Valley until the late 1200s, then focused to the east on Anderson Mesa until 1400 (Bernardini and Brown 2004). To the north are the Ancestral Pueblo traditions defined by the Tusayan branch from A.D. 100-1050, replaced by the Winslow tradition from 1050-1275 and Pueblo IV ancestral Hopi traditions focused locally at the pueblos in the Homol’ovi Settlement Cluster from 1275-1400. To the south and east are Mogollon culture traditions dating from 200-1400. To the east is the Cibola WW tradition, associated with a Pueblo GW tradition, but in the research region typically associated with Mogollon BW, appearing after 1100 in the surrounding region.

To fill these gaps, the first goal of the proposed research is to conduct a survey of 16,000 acres to identify and locate all cultural resources within the study area. The second goal is to relate the sites to variables of physical location and environment as defined above. The third goal is to evaluate four models of border living to evaluate their ability to predict the archaeological record of RAR. The fourth goal is to relate the groups who created the surface archaeological record to the petroglyphs panels in
Chevelon Canyon and elsewhere in the study area. The fifth goal is to relate the archaeological remains to the natural environment to reconstruct cultural landscapes. This will be accomplished with the help of Hopi, Zuni, Navajo, and Apache consultants, the groups with archaeological or historic evidence of use or occupation of the area. The sixth goal is to place the history of RAR within the broader social and cultural landscape of the middle Little Colorado River Valley (MLCRV) to better understand how the people identified themselves by analysis of their changing relationships with their near and far neighbors.

**Modeling and Explaining Settlement and Exchange in the RAR Study Area**

I will concentrate on the ceramic period from 500-1300, which has been the focus of nearly all research in the region and is also the dominant period of occupation at RAR. In conjunction with research of the region summarized above, several scholars have proposed models to explain settlement patterns and ceramic exchange typical of the area from 500-1300. I have grouped these into four categories.

**Exchange to Level Risk Model** (Douglass 1987; Plog 1980; Hantman 1983): Several authors have examined exchange of ceramics between regions, especially large-scale exchange of LCWW from place of manufacture in small villages in the Hopi Buttes to mountainous areas including Flagstaff and the upper Chevelon Canyon from 1050-1250. Using various models to examining distance decay of LCWW from its source to surrounding areas, Douglass (1987:171) determined that the best model was directional exchange of ceramics into areas significantly different from the production area in terms of resources, defined as topography and vegetation zones. She determined that exchange was into border zones between different cultural groups because population growth in the region restricted the range of groups and their access to critical resources. She argues, after Plog (1980), that ceramic exchange was a means of leveling risk for both areas by exchanging mutually beneficial resources still needed by neighboring groups, creating relationships that reduced tension over lack of access to these resources. Hantman (1983) also investigated stylistic variability in pottery and associated it with increased insularity after 1000 and the creation of boundaries and alliances, sometimes with non-neighbors.

**Conflict Model** (Solometo 2001, 2004): Beginning in the mid-1990s, many scholars viewed conflict as a neglected mechanism for understanding settlement patterns and site configurations (see especially LeBlanc 1999; Wilcox and Haas 1993). Unlike the exchange model, Solometo focused on settlement patterns as they varied through time. In the upper Chevelon, Clear Creek and Jacks Canyon areas 30 km south of RAR, Solometo (2001, 2004) documented shifts in settlement patterns attributed to local concerns about safety and adaptations to reduce conflict. Defense and expectation of conflict were present because the CARP area was a borderland where groups with different cultural traditions were nearby with constant threats, real or imagined, to raid food. Similar to Douglass (1987), Solometo views exchange as a mechanism to create and maintain social relationships for alliances in case of conflict. She argues that in the CARP study area, there are focal communities with public architecture, like great kivas, that helped maintain social ties with neighbors until 1150. The focal sites and independent households who farmed small arable plots were closely spaced and formed communities that shared communal storage at the focal villages. Farming in the area can be termed intensive with construction on numerous terraces as well as check dams to augment natural farming areas.

Solometo (2004) describes a major shift in settlement pattern from 1150-1250 when small settlements occupying the area since 500 suddenly moved along the edges of canyons in inaccessible areas into large villages several times the previous size, which had plazas as public architecture. These movements were away from arable land resources to areas where the villages had tactical advantages due to a combination of increased size and defensive constructions or locations. Maximum population occurred just before and during the period of proposed conflict. Beginning about 1100, exchange focused on groups manufacturing the LCWW type, Holbrook B/w. From 1150-1250, exchange was exclusively with the same groups involving Walnut B/w. After 1250 until abandonment, the groups returned to former habitation areas with more abundant arable land, but exchange shifted to the east and manufacturers of CWW. Throughout the period the utility ware ceramics were Mogollon BW.

**Frontier Model** (Herr 2001): Sarah Herr based her study on survey and excavation data created by the Silver Creek Archaeological Project (SCAP) 40 km southeast of RAR. Unlike in the CARP area, the...
situation in her study area was one of a primarily vacant landscape open for new settlement, in her case from the Chaco region in the early to mid-1100s. Similar to CARP, there are focal communities with great kivas, presumably patterned after Chaco great kivas. These great kiva communities are more informal with no communal storage and, as in the conflict model, are longer-lived than household-level settlements. Land use and farming are typically extensive and not as intensive as in the CARP area because households are less stable rather than due to poorer natural resources. Also, there are no intermediate social units, such as lineages or clans, on the frontier, while these social units are expected for conflict and population circulation models. Exchange at the household level creates social ties and often precedes migration by other groups into the area. Migration is encouraged and important to increase potential labor. Nevertheless, exchange is less important than for either preceding model. Settlement is more dispersed than with the conflict model. Architecture is expedient in construction and substantial shifts in settlement are not expected except via expansion into new areas. Pottery is locally made at the household level and there is little exchange because production of material remains is highly redundant across the landscape.

Population Circulation Model (Schachner 2007): Although Schachner’s research focus was in the vicinity of Zuni Pueblo, his model holds promise for the RAR area. He identified a common pattern in marginal community areas, one of social mobility where households constantly come and go from one area to another, usually adjoining, area. In his model, focal sites with public architecture (great kivas early and plazas late) are expected and more stable and long-lived on the landscape. With this model, settlements without public architecture are expected to have short occupation spans, but to cluster in the vicinity of focal sites creating a community. Land use is extensive rather than intensive, similar to the Frontier model. Storage is by household with community storage present only at focal sites. Exchange is within the focal community and with settlements still in the homeland. Migration is common and expected, but can be short-term or even seasonal. The driving force for mobility or population circulation is not due to subsistence concerns, but the need to participate in social events and networks. There is the possibility and even an expectation that material culture of focal communities can and will vary depending on their source population. Population of a region will be influenced by environmental and social conditions. There may be competition between focal communities to recruit migrants for labor.

Statement of the Problem
Archaeological and historic research around the study area indicates a region that was always marginal to the centers of population during the agricultural period where conditions permitted lengthy occupations and stable growth, although settlements may not have been occupied for long periods. In the region referred to as the MLCRV, conditions were not optimal for lengthy settlement. The reasons are primarily environmental. Several models have been proposed to explain how farming groups survived and persisted in the MLCRV for more than a millennium. Each model provides expectations of settlement patterns and history that should be testable with the proposed RAR study area survey data. Thus, the research proposes to test these models to determine which best predicts the settlement pattern of the RAR area. As with many of the previous studies (Herr 2001; Schachner 2007; Solometo 2004), this study will be fine-grained, focusing on the household rather than the site. The household is the primary economic and social unit in small-scale, dispersed farming societies (Netting 1993:100-101). It is defined not by function but by practice, that is, what members of the household actually do (Wilk and Netting 1984). For survey work we do not have to identify what constituted the household at any point in time, only how it is physically manifested on the landscape.

Predicting the pattern
The climate in the RAR study area is marginal for agriculture and required detailed knowledge of precipitation patterns and landforms that concentrated or preserved water for farming. The expectation is for generally small sites organized into discernible settlement clusters forming a community around a focal site of larger size and possessing public architecture. The smaller sites will likely have shorter occupations than larger sites with public architecture. Patterns should be detectable given the development of ceramic chronology by previous researchers that should pertain to the RAR area. The
initial site documentation at RAR indicates settlement during the ceramic period from BMIII to PIII, or 600/800 to 1150/1250.

**Unknowns:** There is a wide array of unknowns for the study area including (1) whether communities comprised of multiple contemporary settlements are present, (2) whether or not there are focal sites and what comprises public architecture, (3) association with resources, (4) longevity of occupation, (5) site sizes, (6) relationship of habitation sites to non-habitation sites and the general landscape. The various models predict how these relationships should pattern and the goal of this project is to test these models for fit to the RAR data.

**Explaining the Pattern – Expectations of the Models for the RAR Study Area**

Given the lengthy history of occupation of the study area, it is possible that more than one model will explain the patterns at different points in time. For example, the frontier model may pertain to the study area at the initial phase of occupation while the conflict model may explain patterns when carrying capacity is reached either due to population growth or decreases in effective moisture. The goal of the proposed project is to test each model with settlement data from each discernible time period as outlined in Table 1.

**Conflict:** According to Solometo (2004), conflict, or fear of conflict, was the driving force throughout the ceramic occupation of the CARP study area. This resulted in relatively tightly grouped communities around large focal sites and longer occupation with intensive use of patchy arable land. Communal storage occurred in the focal sites. Exchange is limited to specific allied areas, not necessarily adjacent communities. The threat of increased conflict resulted in a comprehensive settlement shift, increase in site size, and construction of tactical facilities to protect the community. Changes in material culture are due to changing external relationships rather than migration. If the conflict model has explanatory value in the RAR study area, we would expect tight groupings of contemporary household size settlements, intensification of agriculture and one or more rapid and complete settlement shifts due to perceived or real conflict. Given the association in the CARP area of this settlement shift with the appearance of Walnut B/w in the tactical communities, the presence on numerous sites in the study area with Walnut B/w suggests this model may pertain in the study area.

**Frontier:** According to Herr (2001), frontier areas should see a rapid increase in settlement over a brief period of time. Settlements will be more dispersed than in other models; small – typically household size, with little to no exchange except to the homeland. Exchange is at the site or household level and often precedes additional migration. Farming will be extensive rather than intensive given that in frontiers land is plentiful while labor is scarce. Settlements will form a community around a focal site with public architecture and a longer duration of occupation. If the frontier model has explanatory value in the RAR study area, we should see more dispersed communities than in the conflict model. Exchange will be less and focused on one area. Local production of ceramics is expected within the community or even the site. Intensification of agriculture is not expected. Focal sites are expected as social and religious centers of the community. Focal sites on the frontier will be smaller with less diverse material culture than those in the conflict model.

**Population Circulation:** According to Schachner (2007), the dynamic of population circulation is common in situations where populations are small, farming areas are marginal, but there are adjacent areas with surplus population or where they are nearing carrying capacity. In these situations underpopulated areas experience households or small groups of households who temporarily settle them, sometimes for several years, but frequently return to the homeland if conditions improve there or deteriorate in the new area. Communities formed by these households are fluid and centered on focal communities with communal architecture. Land use is extensive rather than intensive, like the frontier model. Multiple communities centered on a focal community can occupy a region; however, exchange is primarily with the homeland and not nearby communities, similar to the frontier model. The primary differences between the frontier and population circulation models are continuous, punctuated occupation of an area, frequent return to the homeland, and communal storage, which occurs in the focal site in the population circulation model and at the household level in the frontier model. Another difference is more extensive exchange with the
homeland in the population circulation model. Therefore, in the RAR study area if the population circulation model has explanatory value, we would expect to see most sites with short-term occupation contrasted with focal sites, which are longer in duration. However, the same area might experience multiple reoccupations. There should also be more variety in ceramic assemblages within focal sites compared to the frontier model, but less compared to the conflict model. These ceramic assemblages should also be distinctive compared to nearby contemporary communities. Farming should be extensive not intensive.

Exchange to level risk: This model does not predict community size or formation or settlement configuration. It only allows consideration of exchange, which for surface artifacts is limited to ceramics and flaked stone. Following Douglass (1987) and Plog (1980), the expectation of this model is that ceramics exchanged into an area of the MLCRV should be from areas with topography and vegetation different from the study area. Exchange is based on reducing subsistence risk and tensions in border areas where population increases have reduced access to resources. Exchange will be into boundary areas creating social relationships that can reduce tensions. Risk reduction is in direct contrast to the conflict model where exchange is viewed as creating alliances. For the RAR study area, if exchange is based on risk reduction and focused on boundary areas, the expectation is for ceramic exchange from areas with access to different subsistence resources. It is possible that the riparian habitats of Chevelon and McDonald’s canyons provided resources of great economic or symbolic importance to groups lacking these resources, which would primarily be groups occupying the Hopi Buttes. Exchange of ceramics into the RAR area is predicted to be primarily from groups in the Hopi Buttes through much of the occupation of the study area. The risk reduction model is complementary to the population circulation model, but should produce different material culture patterns from the frontier model.

Testing the Models
The models will be tested by collecting multiple lines of evidence in the study area. These will include the following:

1. When was the site occupied? What are the bases for dating the site?
2. What constitutes the household during each period based on regional research and the record in the study area? For example, the pit house, as well as small pueblos averaging five rooms, has been shown to be equivalent to the household (Lightfoot 1994; Varien 1999:16-19).
3. How is the household manifested at the site?
4. How many households are present on the site?
5. What resources are available and at what distance?
6. How many other contemporary settlements are there within 1 km?
7. Do focal sites exist and how are they identified?
8. If a focal site is present, a community must be present. How big and diverse is the surrounding community? If no focal site is present, what constitutes a community? According to Varien (1999:19) a community consists of households that live close to one another and share local social and natural resources. Can these be defined in the study area?
9. How many levels of social engagement are present within sites in the community based on differences in site size and architectural diversity? Different site sizes indicate settlements having single households, those having multiple households that may be equivalent to a lineage, and those large enough to have more than one lineage.
10. What is the intensity and diversity of exchange at each site and within the community based on material culture?
11. What other than habitation sites constitute the community? What do these tell us about the community’s use and engagement with the landscape? Examples are quarrying sites, petroglyphs sites, farming sites defined by terracing and field houses.
12. How do individual sites and the community as a whole relate to the seven habitats identified for the study area?
13. What are nearby natural features that might have been important to the occupants of the site or the community? What are the criteria for this conclusion?

By answering this suite of questions, we will begin to understand the nature of the household and the community through time in the study area, their relationship to natural resources and the landscape, and how their density of occupation, length of occupation, and location of occupation relate to those predicted by the models described above.

**Field Methodology and Collection of Data**

**Survey**

The proposed research project will be conducted through the University of Arizona, School of Anthropology (UASA) Field School scheduled to last five weeks per session for 3 to 5 years. The goals of the fieldschool will be to train students in archaeological survey methods, exposing them to elements of traditional site recording, documentation of landscape features based on topographical variability, and working with traditional communities to incorporate their perspectives of the past. Students will be taken on fieldtrips to modern Hopi communities to experience native culture as well as to regional archaeological sites to gain a sense of the variable topographic, geologic, floral, and cultural landscapes. The students will be able to participate in archaeological site excavations conducted by the University of Illinois, Chicago, (UIC) under the direction of Dr. Vincent J. LaMotta, assistant professor of anthropology. Excavations will be conducted on sites recorded as part of the archaeological survey.

Students will be expected to produce a research project for their final exam for six hours of credit at the undergraduate or graduate level. These projects can be the results of interviews with members of traditional communities, a ranching family, an exhibit, a PowerPoint presentation, a written paper, or another format. The 12 students will be recruited from across the United States. I am asking NSF to fund two college students from local Native American communities to provide training and experience in field archaeology. Stipends to support these students are included in the grant proposal. These students will enrich the experience for the fieldschool students and provide perspectives on land use and the landscape that will inform the proposed research.

Faculty from the University of Arizona and Northern Arizona University and staff from private CRM firms will lecture the fieldschool on regional archaeology, chronology, landscape archaeology, and spatial analysis. Scholars from regional Native American communities will be invited to speak to the fieldschool concerning traditional knowledge and the perspective it brings to field archaeology.

**Data Collection** – Information collected for each site will include UTM location, date range based on diagnostic ceramics or lithic technology, size, diversity of surface evidence – architecture, artifact distribution and type, ash stains or other indications of midden areas, features (hearths, bins, grinding slicks, petroglyphs), association with other contemporary sites, association with habitat type, distance to resources, types of nearest neighbors, and landscape features. A site typology will be developed based on the combination of attributes recorded at the site and its location and access to resources. The survey will include documentation of prevalent vegetation that includes especially exotic and economic types, soil type, geology, exposure, and distance to water, wood, lithic and clay resources. These data will be compared to existing environmental databases maintained in GIS to facilitate evaluation of the relationship between natural resources and site location.

**Artifact Collection** – Agreements with the private landowners will allow the project to collect ceramic, lithic, soil, and geology samples from each site, where necessary. Artifact collections will be kept as part of the permanent record of the site at the ASM as part of the agreement with the landowners. A stratified sampling strategy will be employed following procedures developed by ASM (Lange 1998:10-14). The number of sample units will depend on the size and complexity of the site. Sherds, lithics, and typologically meaningful artifacts such as projectile points will be collected from each site.

**Limited testing** – Dr. Vincent M. LaMotta (UIC) will conduct limited excavations on multiple sites in the study area to compare the surface to the subsurface archaeology. This will improve our interpretation of the archaeology from surface remains. Fieldschool students will be involved in site excavation to broaden...
their field experience. Data collected by Dr. LaMotta will be analyzed at UIC with samples retained for transfer to ASM under agreement with the landowner.

**Consultants** – Consultants from Apache, Navajo, Zuni, and Hopi tribes, groups who have a history of use of the area, will be invited to teach students the value of traditional knowledge and its integration with the archaeological record. Consultants will be asked to evaluate the landscape of the study area in terms of known or potential traditional cultural places pertinent to their interaction with the landscape today and relevant in the past (Kuwanwisiwma and Ferguson 2009). These perspectives will allow the incorporation of traditional cultural places into our understanding and interpretation of the RAR landscape and will be used to further evaluate the models.

**Non-ceramic and Non-Pueblo Sites** –

**Pre-ceramic**: Previous research west of the study area (Huckell and Huckell 2004) located numerous pre-ceramic sites. It is expected these will occur in the study area. The identification and location of these sites is relevant because petroglyphs in Chevelon Canyon have been stylistically dated to 8000 years old (Malotki 2007). We have the opportunity to determine the relationship of pre-ceramic land use to the petroglyphs panels. The potential to correlate dates of archaeological sites on the basis of projectile points and lithic technology to petroglyphs styles will contribute to understanding the early prehistory of the area. The number and distribution of pre-ceramic sites will provide our best understanding of how these groups utilized the landscape, potentially the size of the groups, and how they circulated through the region based on the sourcing of lithics or point styles. An important development in the area was the arrival of maize and other cultivated plants. Research at the nearby God’s Pocket settlement radiocarbon dated a maize cob to a calibrated date range of 2600 +/- 65 years BP. Given our information on the lithic technology and projectile points from the God’s Pocket site, it should be possible to identify contemporaneous settlements that can be tested for the presence of cultivars. These can be compared to the early agricultural patterns of land use and site location identified south of the study area by Briuer (1977).

**Post-ceramic**: The identification of hunting and gathering groups in the vicinity of the study area in 1583 by the Espejo Expedition suggests there may be non-ceramic or non-Pueblo ceramic and lithic sites in the study area that date from the 16th century and later. There are no indications of these groups in the known petroglyphs panels, but petroglyphs, ceramics, and lithics from Apache or Yavapai groups that have been identified elsewhere will be used to identify the presence of these groups (Herr, North, and Wood 2009; Whittlesey, Deaver, and Reid 1997). Location of settlements related to this period will shed light on the purpose of these settlements. Presence or absence and type of Euroamerican manufactured artifacts will aid in dating of these sites.

**Artifact Analysis** – The artifacts will be analyzed to confirm typology and source of lithics and ceramics. Sourcing studies for lithics and ceramics are a top priority and will begin with petrographic analysis, but may include neutron activation analysis for ceramics and will include XRF analysis of obsidian. The ceramic typology will be based on those already established in the research projects from surrounding areas. Local alluvial and geological clays will be collected and sourced using petrofacies analyses and INAA to establish whether any pottery recovered from sites is locally made. Samples of ceramics from no known manufacturing area or where petrography matches local materials will be submitted for INAA to confirm local manufacture. Locally made ceramics will most likely be plain or utility wares as areas of manufacture of all local decorated ceramics are well established. Extensive analyses of LCWW, TWW, and CWW by previous researchers have identified source areas (Douglass 1993; Plog 1980; Solometo 2004). Where decorated ceramics do not fit established typologies, analysis protocols similar to plain wares will be implemented for decorated ceramics to determine sources of manufacture. XRF analysis of obsidian will be used along with ceramics to test the expectations of the various models by documenting the movement of lithics and ceramics in predicted exchange systems.

**NSF Support** – Room, board and transportation of faculty, staff, and students will be funded by UASA through the fieldschool. NSF support is requested to pay tribal consultants, visiting faculty, stipends for two Native American participants, and petrographic, XRF, and INAA sourcing analyses of clays,
tempering materials, obsidian, and ceramics. This funding will enrich the fieldschool experience of the students and advance the research goals of the project in complementary ways.

**Implications for Anthropological Method and Theory**

The research will test four models of how groups behave in border regions. The archaeological record will be compared to expectations based on the area as a new frontier, as one on a border with concerns about safety in a conflict situation, as an area of resource opportunity with multiple short-term uses, or one where exchange is used to reduce risk and increase economic security. More than one model may fit the archaeological record at different points in time. Therefore, the proposed research will evaluate long-term adaptation in a persistent border region and the social and economic adjustments made at the household and community level to survive and even prosper. In addition the proposed research will look at household and community adaptation and modification of the landscape to create a memorable homeland (Zedeño and Bowser 2009). How the landscape is culturally modified will also inform on which model or models best explain the archaeological record. Because research in archaeology in the Southwest U.S. and beyond tends to focus on the major cultural traditions, defining border areas more in terms of what they are not rather than what they are, it is important to balance our perspective of the past with research into areas where identity was more nuanced and the importance of persistence was focused on the household within a small community. The study of border regions is applicable to method and theory world-wide in the past to the present (Naum 2010; Smith and Rubinson 2003).

**Broader Applications to Local, National, and International Audiences**

Perhaps the broadest impact of the proposed research is its application to border regions in today’s world, which are places of tension, contention, and mixed identity. The proposed research will evaluate what it means to live in an area in the past with similar conditions. Another broad impact is the use of the fieldschool to train students in field methods, field research, the application of archaeological science to field archaeology, and the importance of traditional knowledge to understanding the archaeological record and how these tools can be applied to areas throughout the world where similar conditions exist. Traditional knowledge will be provided by enrolled members from several adjacent tribes who will participate in mentoring and training fieldschool students in ways to view the present and past differently than through western science. Thus, the research program will train students about the relevance of archaeology to understanding present and persistent human conditions. Another impact is working with local ranchers to develop preservation and interpretation plans. The family who owns RAR is already fully involved in Cultural Tourism, hence the name Rock Art Ranch. The goal of this family is to better understand the archaeological context of their ranch as it relates to the petroglyphs in the canyon and to past land use practices. This understanding will be used to enhance visitor experiences on the ranch and thus preservation of the sites and information are of high priority. Ultimately, the project’s goal is to create a regional understanding of the history of occupation and use of the southern Colorado Plateau.

**How will the project integrate research and education by advancing discovery and understanding?**

The project is an archaeological field school whose goal is to train undergraduate and 1st or 2nd year graduate students in field methods, research and the application of technology to the enterprise. Each student will be responsible for a research project using knowledge generated from the research project. Scholars will be brought into the field to teach through lectures and train students in many subfields of archaeology, including tree-ring dating, zooarchaeology, archaeoethnobotany, GIS applications, and the like. Native anthropologists and cultural resource specialists will be brought to the study area to discuss concepts of cultural landscape. These presentations will enable students to broaden their knowledge and deepen the research presented in their individual projects.

**Ways in which the activity will broaden the participation of underrepresented groups.** Two scholarships will be awarded to Native American students planning to attend or already attending college. Native cultural resource specialists will be brought as consultants to participate in the project in discussing concepts of cultural landscape and its application to the study area.

**Dissemination of Results**
Results will be disseminated through the School of Anthropology’s and Arizona State Museum’s websites at the University of Arizona. Results will also be disseminated at professional meetings at the state, regional, and national level by faculty, staff, and students. Results will be shared with local Native American communities through public presentations and with local ranchers to enhance their efforts at appropriate cultural tourism. Results will be published in regional and national journals and electronically through the Arizona State Museum Electronic Publication Series accessed through its website.

Table 1. Chronological and cultural framework for identifying archaeological remains in the Rock Art Ranch study area.

<table>
<thead>
<tr>
<th>Chronological Period</th>
<th>Pre-Agricultal</th>
<th>Pre-Ceramic, Agricultural</th>
<th>Ancestral Pueblo: Cibola, Little Colorado &amp; Tusayan: Gray Wares</th>
<th>Mogollon: Brown Wares</th>
<th>Post-Pueblo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Archaic: 7600-1500 B.C.</td>
<td>Early: 7600-3000 B.C.</td>
<td>Late: 1500-800 B.C.</td>
<td></td>
<td></td>
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<tr>
<td>Early Agricultural: 800 B.C. – A.D. 500</td>
<td>Early Basketmaker II: 800 B.C. – A.D. 100</td>
<td>Late Basketmaker II: A.D. 100-500 (pre-ceramic)</td>
<td>Mogollon I: A.D. 200-500 (brown wares may be present)</td>
<td></td>
<td></td>
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<tr>
<td>Post-Pueblo: 1400-1583</td>
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<td></td>
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<td>Early Apache &amp; Yavapai</td>
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<tr>
<td>Early Historic: 1583-1850</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Historic Navajo, Apache and Yavapai</td>
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<tr>
<td>Historic Anglo: 1850-1900</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Early Anglo ranching</td>
</tr>
</tbody>
</table>

Notes: Mogollon designations are arbitrary due to the preference for developing local phase sequences throughout the Mogollon culture area. The date 1583 is when members of the Espejo expedition documented non-Pueblo groups in the vicinity of the study area (Hammond and Rey 1929; 1966).
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