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The Journal of Arizona Archaeology is a peer-reviewed journal that focuses on the presentation of emerging ideas, new methods, and current research in Arizona archaeology. It endeavors to be a forum for the scholarly, yet simple communication of research and management related to Arizona's archaeological record. The journal is published twice a year by the Arizona Archaeological Council (AAC). At least one issue per year is devoted to the theme of the AAC annual fall conference. The conference issue (or issues) is overseen by a guest editor. The remaining issues of the journal are intended for open submissions. The frequency of general submission issues is dependent on the number of appropriate manuscripts received throughout the year and the workload of the editorial staff.

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CELEBRATING 50 YEARS OF THE NATIONAL HISTORIC PRESERVATION ACT IN ARIZONA

PREFACE

Christopher P. Garraty, Guest Editor

This issue of the *Journal of Arizona Archaeology* started as a series of invited papers for the Arizona Archaeological Council (AAC) Fall Conference held at the Arizona Museum of Natural History in Mesa on November 7, 2014. The conference was intended to be a celebration of the National Historic Preservation Act (NHPA) and the preservation of places and the educational and cultural benefits that compliance with the law has generated over the past five decades in Arizona. The conference's specific objective was to take stock of the law's achievements and highlight some of the more prominent and exciting archaeological findings in Arizona archaeology that have come to light since the law's passage of in 1966. However, the invited speakers at the conference were also asked to critically evaluate the law's shortcomings, where appropriate, and call attention to areas and aspects of the law that require improvement. Website links to the NHPA and other federal legislation frequently cited in this volume are listed at the end of this preface.

The invited papers presented at the 2014 Fall Conference covered a range of topics pertinent to the implementation of NHPA-driven archaeology in Arizona. Most papers focused on specific findings and advances in our knowledge of the archaeological record in Arizona that have resulted from NHPA-driven archaeological research, such as the evidence for the earliest irrigation-farming communities in the Tucson basin (e.g., Mabry 1998). Others highlighted the history of the NHPA in Arizona and how its implementation has changed over time. Another set of papers addressed efforts to include Native American perspectives and interpretations in the cultural resources consultation process. A final paper addressed questions concerning the future of the NHPA and the particularly important question of how we should manage and make sense of the massive body of information and records generated by NHPA-driven archaeology. The same range of themes are addressed in the articles included in this journal issue. This issue includes six articles that started as papers presented at the 2014 AAC Fall Conference (Peoples et al., Howard, Schoenwetter, Ciolek-Torrello and Heilen, Hackbarth and Garraty, Hopkins et al.) and two additional articles that were solicited after the conference (Altschul, McManamon and Kintigh).

Two articles in this issue offer historical perspectives on the implementation of NHPA-driven archaeology in Arizona. Ann Valdo Howard, the current Deputy State Historic Preservation Officer for the state, provides a narrative historical overview of the Arizona State Historic Preservation Office (SHPO) and discusses how the SHPO's approach to implementing the NHPA has changed from its inception in the 1970s through the present day. The late James Schoenwetter's brief paper focuses on some of the challenges and obstacles that he faced in his effort to implement a NHPA-driven data recovery project before current guidelines and procedures had been established. Schoenwetter specifically describes his struggles to implement an NHPA-driven archaeological investigation at the site of AZ U:9:24 (ASU) in Mesa in 1972, just six years after passage of the NHPA.

Three articles assess advances in archaeologists' understanding of the past that can be directly attributed to archaeological projects in Arizona completed in compliance with the NHPA or various state and local laws and ordinances inspired by the NHPA. Richard Ciolek-Torrello and Michael Heilen discuss several NHPA-driven archaeological projects that have greatly enhanced our understanding of prehistoric societies in the peripheries of the Phoenix Basin, specifically the vast uplands to north and northeast of the basin (Northern Periphery) and the arid desert lowlands to the southwest (Western Papaguería). Without the NHPA, they argue, it is unlikely that archaeologists would have achieved the current breadth and richness of knowledge about prehistoric occupations in these areas. As they explain, "[t]he wealth of data generated by these studies has allowed us to resolve many pressing issues regarding the prehistory of these peripheral areas at a level of detail rarely available to prehistorians working in any region."

The article by Matthew A. Peeples, Jeffery J. Clark, William H. Doelle, Andy Laurenzi, and Barbara J. Mills address this same general issue—the positive impact that NHPA-driven archaeology has had on archaeologists’ knowledge and understanding of the past—but they address this question on a much larger scale. Using site information derived from the extensive Southwest Social Networks (SWSN) project database (e.g., Mills et al. 2013a, 2013b, 2015), they compiled and analyzed data from more 1,700 prehistoric settlements within their study area in eastern Arizona and western New Mexico during the late pre-contact period (A.D. 1200-1450). When NHPA-driven projects were removed from their database, they observed huge gaps in the spatial coverage of the database, which very clearly and unequivocally underscores the positive impact that NHPA-driven archaeology has had within their study area. As they explain, the NHPA and similar resource-management laws have “dramatically increased the pace of archaeological work and facilitated investigations into many regions and categories of sites which had seldom been the focus of academic study.” They also describe and champion an “archaeological priority planning” approach that integrates archaeological preservation with an assessment of a site’s research potential within the framework of their regional-scale analytical perspective.

Mark R. Hackbarth and Christopher P. Garraty also address the broader impact of NHPA-driven investigations on a large scale, but their study focuses exclusively on historical period sites. They queried AZSITE, a site records database maintained by Arizona State Museum, to obtain information about the spatial distribution of historical sites and site types on a statewide scale. They also consider the impact of not just the NHPA but also the later state and local ordinances that were inspired by it. Their longitudinal study demonstrates a clear increase in the number of historical period sites recorded statewide following passage of the NHPA in 1966, with a pronounced surge in the frequency of site recording in the late 1980s. This second surge could mark a critical period when federal, state, and local land-managing agencies widely acknowledged and systematized procedures and policies for consultation under the NHPA and other laws. They also assess longitudinal changes in the frequencies with which different sites types were recorded and attribute increases in the identification of some “low-visibility” site types (such as trash dumps) to the widespread implementation of cultural resources inventory projects mandated by the NHPA and other laws.

Maren P. Hopkins, Stewart B. Koyiyumptewa, Leigh J. Kuwanwisiwma, and T. J. Ferguson’s article highlight a form of NHPA-driven research that has become increasingly prevalent over the last decade or so: the inclusion of Native American perspectives in interpretations of the archaeological record. Their case study highlights the results of a successful research collaboration between the National Park Service (NPS) and the Hopi Tribe for a study of cultural resources at the Glen Canyon National Recreation Area and Rainbow Bridge National Monument in northeastern Arizona and southeastern Utah. This forward-looking study was implemented as part of the NPS’s efforts to comply with Section 110 of the NHPA. Tribal participants in this study identified traditional place names and relayed ancestral narratives about 33 different cultural resources within the project landscape. As a result of this study, the NPS obtained a far richer and more comprehensive understanding of the significance of these prehistoric resources than could be achieved solely through the narrower lens of scientific “research potential.” The NPS is now able to more thoughtfully and respectfully manage cultural resources based on the perspective of the descendant communities whose ancestors created them.

The final two articles in this issue focus on the important question of how we manage and handle the enormous amount of data generated by NHPA-driven archaeological projects. Francis P. McManamon and Keith W. Kintigh’s brief article addresses a critical concern pertaining to archiving and management of data and ensuring its continued accessibility and management for future generations of archaeologists. In McManamon and Kintigh’s view, a central implication of the NHPA is that the data obtained for NHPA-driven studies be properly and efficiently managed and made accessible to the public. Over the past 50 years, however, data generated from NHPA-driven archaeological investigations all too frequently have been “buried” in gray literature as limited printings of project reports that receive limited distribution. They specifically espouse archiving and storage of archaeological reports and data using the Digital Archaeological Record (tDAR), a National Science Foundation-funded online searchable repository for digital documents and datasets. They underscore tDAR’s value as a digital repository using a case study of the Bureau of Reclamation-sponsored Roosevelt Dam Archaeological Project in the Tonto Basin in east-central Arizona.

The final article by Jeffrey A. Altschul stresses the crucial need for synthesis of the enormous body of data generated by NHPA-driven studies over the past 50 years. All too frequently, NHPA-driven archaeological projects have adopted a parochial framework that narrowly focuses on compliance and project area-specific research questions. Following a detailed historical overview of synthetic studies in archaeology, Altschul makes a compelling plea to the cultural resources management (CRM) community to synthesize data within a broader perspective that addresses “high-level” theory and important anthropological questions. Altschul offers powerful programmatic recommendations for pursuing archaeological syntheses, and he challenges CRM archaeologists to “think big” and to look for new and innovative ways to make archaeology relevant to contemporary problems and issues. Altschul’s powerful final statement on this topic is worth repeating here in full:

NHPA compliance has become a heavily regulated, bureaucratized process. It often feels as though the completion of the process is the goal as opposed to achieving the right preservation outcome. But such is not the case. The goal is to better society, and to meet that goal, American archaeology needs to reassert that synthesis can no longer be viewed as something apart from compliance. To make this assertion resonate with the public, we must focus on questions of importance in ways that do more than explicate the past but marshal understanding of the past in ways that seek to solve today’s problems and advance the prospects of our society for the future. To do so, we need to transform how we do our work and how we interact with each other. We need a national archaeological synthesis center.

In conclusion, the practice and implementation of NHPA-driven archaeology has become a finely honed craft, and crucial advances have been made in recent years with respect to the inclusion of Native Americans and other descendant communities, data collection and management technologies, development of research designs and protocols, and many other aspects of how archaeologists implement NHPA-driven archaeological projects—i.e., the important questions about “how” we practice NHPA-driven archaeology. In my view, however, a targeted conversation is sorely needed to reignite discussion of the bigger “why” questions about the underlying concepts, philosophy, and broader national meaning of the NHPA. More than a decade ago, Joseph Tainter (2004) lamented the dearth of meaningful publications about the NHPA and CRM archaeology in general, and he called for a renewed critical reevaluation of the NHPA. Tainter pointed out that these sorts of publications were prevalent in the 1970s and 1980s but have since declined. I see no evidence that the status quo observed by Tainter has changed for the better over the past 12 years. In this vein, I sincerely hope this issue triggers a dialogue about the direction, goals, and conceptual framework of the NHPA and NHPA-inspired laws and ordinances.

Finally, I wish to thank all the authors who contributed to this volume as well as the those who presented papers at the 2014 AAC Fall Conference. In addition to the contributors to this volume, other conference presenters included Jesse Ballenger, Jeffrey Dean, William Doelle, Jerry Howard, Michael Lindeman, Chris Loendorf, Peter Pilles, Greta Rayle, Glen Rice, Helena Ruter, M. Scott Thompson, Ronald Towner, James Vint, Henry Wallace, and Kyle Woodson. I also would like to express my gratitude to the conference sponsors for their generous donations: Archaeological Consulting Services Ltd., Aztec Engineering Group, Desert Archaeology Inc., Gulf South Research Corporation, Logan Simpson, Maney Publishing, PaleoWest Archaeology, Statistical Research Inc., SWCA Environmental Consultants, WestLand Resources, and William Self Associates. Many thanks to Jerry Howard, Tom Wilson, and the staff at the Arizona Museum of Natural History in Mesa for hosting the AAC conference and providing a friendly and accommodating venue and conference space.

Thanks also to the peer reviewers who generously volunteered their time to review manuscripts for this volume: David Abbott, Wesley Bernardini, J. Simon Bruder, Andrew Darling, Donald Fowler, Eric Klucas, Kathryn Leonard, Shereen Lerner, Teresita Majewski, Douglas Mitchell, Alanna Ossa, Christopher Watkins, Joshua Watts, and one anonymous reviewer. I extend thanks also to the members of the journal’s editorial panel for their copyediting and peer review effort. Finally, I wish to thank the journal’s editor, Glen Rice, and the managing editor, Erik Steinbach. Website links to the National Historic Preservation Act and other Federal legislation frequently cited in this volume are listed at the end of this preface.

The volume is dedicated to the memory of Dr. James Schoenwetter.

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THE BIG PICTURE: THE NATIONAL HISTORIC PRESERVATION ACT AND REGIONAL SYNTHESSES IN THE U.S. SOUTHWEST

Matthew A. Peeples
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ABSTRACT

Soon after the National Historic Preservation Act (NHPA) was signed into law in 1966, the Section 106 process and compliance based archaeology quickly became the primary mechanisms through which new data were generated across the United States. Heritage management projects facilitated explorations of regions and categories of archaeological sites that had seldom been the focus of academic research and also provided data essential for addressing “big picture” questions at scales not previously possible. In this article, we explore the importance of syntheses and regional databases for both research and preservation. First, we demonstrate the role that compliance archaeology data have played in recent research focused on the late pre-contact period (A.D. 1200-1500) in the U.S. Southwest using an example from the Southwest Social Networks Project. We explore how our interpretations of several important regional-scale processes might differ if data generated through work mandated by the NHPA were not available. Next, we demonstrate the utility of synthetic databases for preservation planning by outlining a systematic approach toward identifying and characterizing site/landscape protection priorities. We argue that this approach offers opportunities to go beyond site-level evaluations of significance to develop landscape-scale perspectives on the relative importance of cultural resources.

A little more than a decade after the National Historic Preservation Act (hereafter NHPA) was passed into law in 1966 (54 U.S.C. § 300101 et seq.), the Section 106 process and compliance based archaeology became the primary mechanisms through which new archaeological data were generated across the United States. It would be difficult to overstate the impact of this law on archaeological knowledge and practice in the U.S. Southwest. Heritage management projects mandated by the NHPA and related laws such as the National Environmental Policy Act (42 U.S.C. § 4321 et seq.) have dramatically increased the pace of archaeological work and facili-

tated investigations into many regions and categories of sites which had seldom been the focus of academic study. Importantly, compliance based projects have also helped to generate massive amounts of data essential for addressing “big picture” questions about life in the U.S. Southwest at scales never before possible. In this article, we focus in particular on this last point to explore the importance of the NHPA for synthetic research and also the new opportunities for archaeological preservation created by such syntheses.

Synthesis has long been an important goal for archaeologists working in the U.S. Southwest (e.g., Schachner 2014). Kidder published the first major synthesis of southwestern archaeology in 1924 (Kidder 1924) which, together with work presented in the subsequent Pecos Conference (Kidder 1927), created a consistent framework for thinking about culture, time, and social change across broad geographic scales. This framework still has a great deal of import today. Using this early work as a baseline, archaeologists working in the Southwest have long been quite comfortable thinking both locally and “globally,” viewing individual excavations and survey projects as part of a larger whole. Efforts toward syntheses in recent decades have continued in several distinct but complementary directions. Short term collaborations among scholars working in both cultural resource management (hereafter CRM) and academic settings have resulted in several important and detailed overviews of particular time periods (e.g., Adams and Duff 2004; Adler 1996; Wilshusen et al. 2012; Young and Herr 2012) or regions (e.g., Gregory and Wilcox 2007; Lekson 2006). A number of large CRM projects have also resulted in major syntheses of large portions of the Southwest, generating data the likes of which earlier researchers could have scarcely imagined

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(including among many other examples the Dolores Archaeology Project, several large Tonto Basin projects, as well as numerous major projects along the Rio Grande such as the Cochiti Dam project).

As the examples above suggest, archaeologists working in the Southwest have access to tremendous amounts of extant data and new data are being generated at an ever increasing rate. In recent years, the sheer volume of data available has both facilitated and necessitated new approaches to synthesis that involve the compilation of massive databases as well as new tools to manage and archive those data (see Kintigh 2006). Indeed, several of the most influential recent projects in the Southwest have been based primarily on new analyses of existing data, compiled and standardized, augmented by targeted new field and collections work, such as the Village Ecodynamics Project (e.g., Kohler and Varien 2012; see other examples in Schachner 2014). We suggest that this new model for data-driven synthesis will be increasingly important in decades to come.

In this study, we explore the relationship between the NHPA and synthesis in two ways. First, we draw on a recent example of data-driven synthetic research from the collaborative Southwest Social Networks project to demonstrate the enormous impact that the NHPA has had on both the availability and quality of data across a large portion of the Southwest. To do this, we explore the Southwest Social Networks database by systematically removing data generated through NHPA mandated work to illustrate how our interpretations of several important social processes might differ were those data not available. Next, we then examine how the creation of such synthetic data resources for research can also help to inform and improve archaeological preservation planning and outcomes. We argue that efforts towards the compilation of regional data can help us move beyond project-by-project assessments of archaeological sites through a process we call archaeological preservation planning. This serves as one example of how research and preservation can be profitably integrated to push both endeavors forward.

THE SOUTHWEST SOCIAL NETWORKS PROJECT AND DATABASE

The Southwest Social Networks (SWSN) project is a multi-disciplinary collaborative project funded through the National Science Foundation (University of Arizona and Archaeology Southwest) and focused on exploring patterns of interaction and connection at broad scales across a large portion of the late pre-contact (A.D. 1200-1450) U.S. Southwest (e.g., Mills et al. 2013a, 2013b, 2015). The project involves the application of methods and models from social network analysis (SNA) to a large database of archaeological settlement and material cultural information. The first iteration of the project focused on the period from A.D. 1200-1500 across

Arizona and western New Mexico. An expansion of the project is currently underway covering the greater Chaco World across the Four Corners to areas just beyond the southern edge of the Colorado Plateau (ca. A.D. 800-1200). The SWSN 1.0 database that is the focus of this article consists of geographic, site-size, chronological, and architectural information for over 1,700 major settlements (> 12 rooms) in Arizona and New Mexico west of the North American Continental Divide (an area of 334,000 sq. km). These data comprise a subset of the larger Coalescent Communities Database (see Hill et al. 2004, 2012; Wilcox et al. 2003). We have also compiled systematic tabulations of painted and plain ceramic types and wares for over 700 of these sites and sourced obsidian objects for more than 200 sites from published sources, unpublished notes, and new analyses conducted by team members. Altogether, the database contains information on more than 4.9 million ceramics classified by type and over 8,000 chemically characterized obsidian objects.

The ceramic and obsidian data described above are used to explore changing patterns of social interaction across the study area through time. Specifically, the SWSN team has used similarities in the artifacts consumed and discarded at individual settlements as an indication of the probability of interaction among the inhabitants of those settlements (see Mills et al. 2013a, 2013b, 2015; Peeples and Roberts 2013; Roberts et al. 2012). We direct readers to the publications cited here for the specifics but in short, we use these data to create statistical characterizations and visualizations of the strongest patterns of similarity among sites in 50-year interval “snapshots” during the late pre-contact period. These procedures can be summarized in a series of maps showing connections (edges or ties) drawn between pairs of sites (nodes) that share substantial similarities in the artifacts discarded there. Although the details certainly require additional analysis and interpretation, we suggest that these maps provide an indication of the most robust patterns of regional interaction and connection across the study area through time. We have used these data to explore a number of social phenomena including the role of long-distance migration in transforming patterns of interaction (Mills et al. 2013a), the influence of geographic scale on social networks (Mills et al. 2015), the relationship between spatial and social connections (Hill et al. 2015), the role of networks in the persistence of regional populations (Borck et al. 2015), and the key position of intermediate “broker” settlements in directing the flow of interactions (Peeples and Haas 2013).

In many ways, the SWSN is an ideal example of working with legacy data. Our analyses are focused only on the largest and latest pre-Hispanic sites from the study area. We are specifically focused on periods when surface architecture, easily observable even without excavation, was the norm. Further, our analyses empha-

size broad categorizations of ceramic artifacts (wares) that have been agreed upon by archaeologists for many years in most portions of the study area. The kinds of sites that are in our database are large sedentary settlements that have been of interest to archaeologists for more than 100 years and targeted by many early projects. Even in this kind of best-case situation, however, we would be missing a substantial amount of information on many sites and regions if data collected by NHPA mandated projects were not available. By our best estimates, just over 60 percent of the 4.3 million sherds in the database were generated by CRM work. In addition, a substantial portion of the remainder involved new analyses of collections from NHPA-related work. Without these data, our ability to analyze and interpret regional patterns of interaction would be considerably diminished.

What if the NHPA did not exist?

Asking this hypothetical question allows us to take stock of the NHPA and what it has done for archaeology in the Southwest over the last 50 years. In this section, we attempt to account for and systematically remove all data generated through NHPA and related cultural resource work to get a sense of what we would be missing. Would a data-driven synthesis such as the SWSN

project even be possible without those data? Would our interpretations of social process differ substantially? Are there areas of the Southwest that have been more impacted by the NHPA than others?

Accounting for all data generated through the NHPA and other archaeological resource management laws is not as straight forward as it may seem on the surface. As a first cut, we removed all data in the SWSN database obtained from NHPA mandated reports and, to the extent that documentation was available, removed additional collections analyzed by the project team that were generated through CRM projects. In addition to projects carried out as part of NHPA related works, we also removed data from projects that were part of pre-1966 Highway Salvage and similar efforts in New Mexico and Arizona as these projects set

the stage for the NHPA. We did not, however, remove data generated through research projects at sites first discovered through NHPA activities as we felt we could not do this consistently across the entire study area. Further, we made no effort to remove research projects that were initially spurred by work conducted under NHPA activities. Thus, the analyses presented here can be thought of as an assessment of the minimum possible impact of NHPA mandated work on data availability.

Figure 1 shows the distribution of sites for which we have data with the removed NHPA sites indicated. This map illustrates a well-known fact about the distribution of research effort in the Southwest. The NHPA has had a far greater impact on the availability of data in the areas south of the Mogollon Rim as opposed to the upland Colorado Plateau. We would point out that although data are still available for a large number of sites in the northern Southwest, they are often smaller samples and of lower quality than the data available to us through NHPA projects (including Section 110 related work involving federal lands). While it is certainly true that we would have sought out other data in many of the areas where we are missing information, this map certainly paints a bleak picture of what might have been.

So how would the removal of these NHPA-generated and other related data change our interpretations

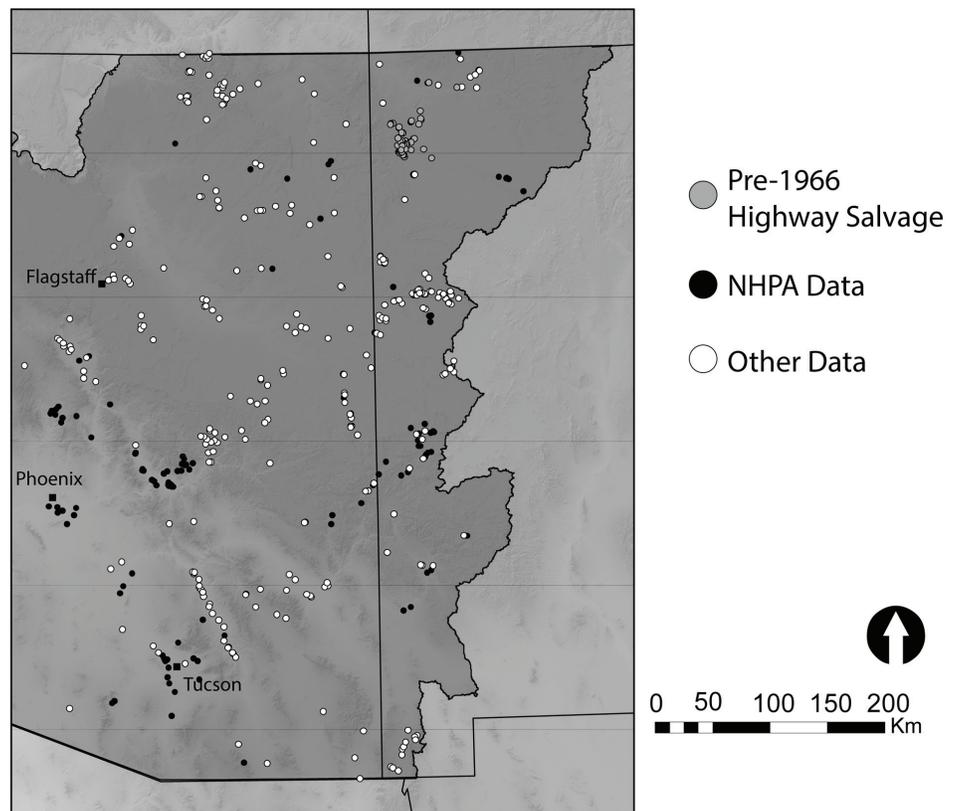


Figure 1. Map of the Southwest Social Networks project area showing all sites with ceramic data, color coded to highlight those data generated through NHPA and Highway Salvage related work.

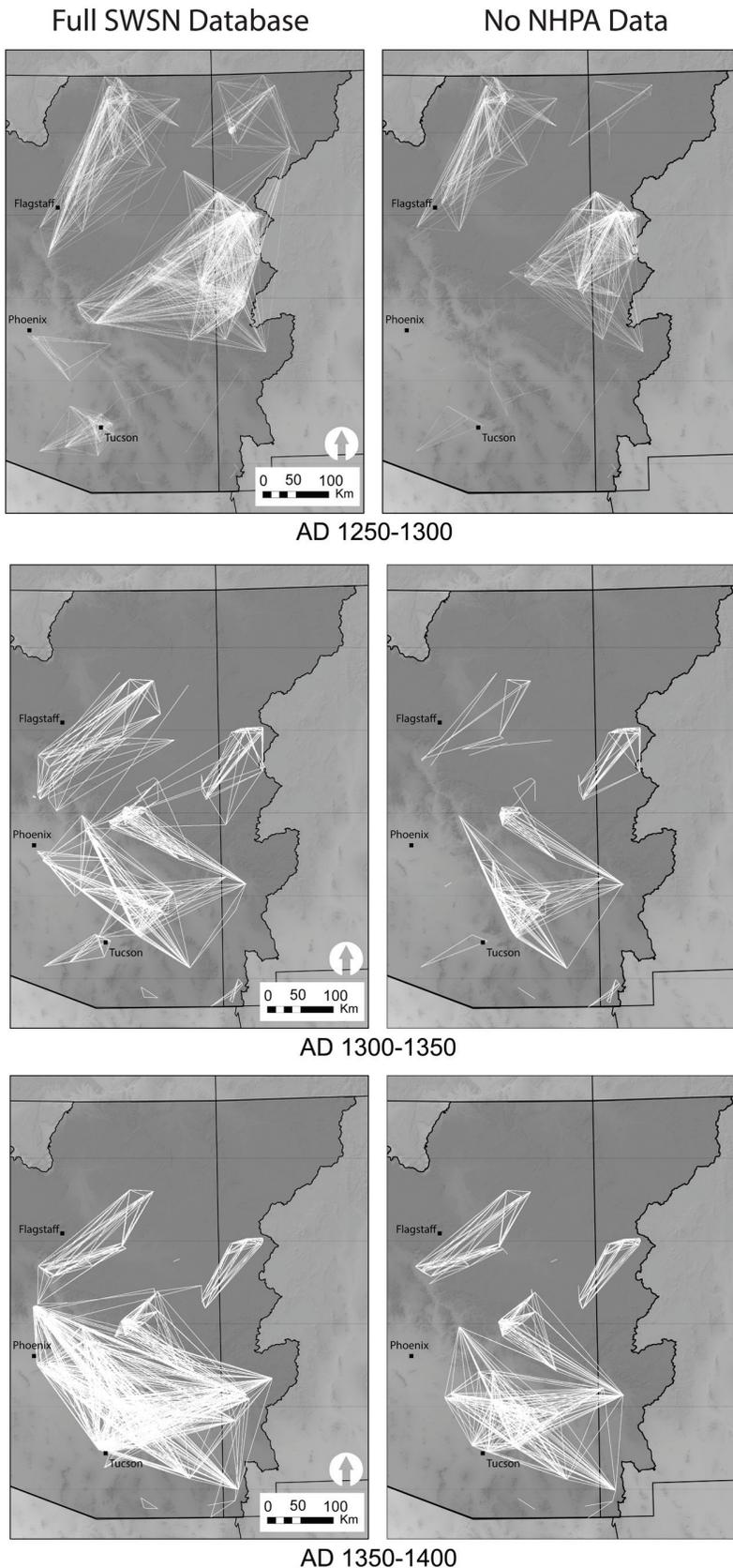


Figure 2. Network maps showing connections based on strong ceramic similarities for three 50-year intervals between A.D. 1250 to 1400. Maps on the left are based on the full SWSN database and those on the right exclude data generated through NHPA and related compliance work.

of broad-scale social processes? In order to answer this question directly, we used the reduced (NHPA data removed) dataset and conducted the same sets of analyses we have previously used as part of past SWSN publications (see Mills et al. 2013a, 2013b, 2015). These analyses include dividing ceramic frequency data into 50-year intervals and calculating similarities in the ceramic wares recovered from every possible pair of sites across our study area. Figure 2 shows a series of network maps for three 50-year intervals both with (left) and without (right) cultural resource law mandated data. Sites are not shown on these maps, but only the connections between them. A connection between a pair of sites means that they share at least 75 percent of their ceramic wares (by frequency) in common for that 50-year interval. This is not meant to represent evidence of direct interaction but only serves as a proxy for the probability of some kind of social connection (see Mills et al. 2013a, 2015). We have chosen three sequential 50-year intervals here by way of example, but the same kinds of issues we point out here are true across all six intervals for which we have data.

The first set of maps at the top row, representing the interval from A.D. 1250 to 1300, highlights the paucity of data in the southern half of the study area. The dense cluster of connected sites around the Tucson and Phoenix areas that are clearly visible in the map including NHPA data are fragmented or non-existent in the hypothetical map to the right. Further, important areas such as the Tonto Basin near the transition between the northern and southern Southwest are missing in the hypothetical map, resulting in the removal of most of the longest distance connections for this period. The northern half of the Southwest is somewhat more similar between the two maps but the three clusters of highly connected sites are both less dense and more distinct from each other in the hypothetical map. The next two sets of maps show the same kinds of changes when NHPA data are removed. The number of long-distance ties decreases substantially. Areas that were major centers of population in the pre-Hispanic period, such as the Phoenix Basin, are absent in

the hypothetical maps. Further, removing NHPA data in all cases resulted in the removal of most of the key intermediate sites that link regions and dense clusters of highly connected settlements.

This brief and simple visual comparison of the impact of the NHPA and related laws on our interpretations of the SWSN project data is telling. Could we have attempted a data-driven synthesis such as the SWSN project were NHPA not available? Perhaps such an effort would have been possible at a smaller scale but it likely would have been necessary to create large amounts of new data to fill in the many substantial gaps. The lack of consistent and systematic data from areas in southern Arizona in particular would be a particularly difficult obstacle to overcome. Would our interpretations of social processes based on the SWSN change were NHPA data not available? Unequivocally, the answer is yes. The removal of NHPA data resulted in the removal of many of the longest-distance connections that we have previously attributed to patterns of long-distance population movement and implicated in transformations of the region as a whole (Mills et al. 2013a). Further, many important intermediate areas near cultural and environmental boundaries—areas that we sometimes think of as “peripheral” to centers of population and culture—fell out when we removed NHPA data (including many sites in the transition zone between the upland and lowland Southwest). Such areas have been quite important in our interpretations of how people used and responded to their network positions through time (see Borck et al. 2015; Peeples and Haas 2013). Many of the most interesting social interpretations from this project involve processes that we would not have been able to track given the sparse dataset missing NHPA generated data.

The NHPA has done much for archaeology in the Southwest. Work conducted under its auspices has provided new data from many understudied time periods and places. The NHPA has resulted in the creation of large quantities of high-quality data in many areas where only general information were previously available. In many ways, the standardization of archaeological practice through CRM has improved standards of data recording considerably. Importantly, this brief overview shows the huge impact that the removal of NHPA data would have had on the SWSN project even given the best case scenario.

SYNTHESIS AND CULTURAL RESOURCE PRIORITY SETTING

The NHPA has been important in facilitating archaeological syntheses. We have generated far more data from many more places than would have been possible over the last 50 years were it not for such cultural resource laws. The question that remains, however, is where do we go from here? We argue that the kinds of data-driven syntheses we have described above are useful, not

just for addressing interesting research questions, but also for improving our efforts to ensure the protection and management of archaeological resources and landscapes over the long-term. In this section, we briefly outline one potential approach toward integrating research and site preservation efforts that we call archaeological priority planning (see Laurenzi et al. 2013 for a detailed overview of this approach).

Recently, there has been an ever increasing demand from archaeologists working with federal, state, and tribal agencies for developing new ways to assess cultural resources at scales above individual historic properties. For example, the Department of the Interior recently published a set of guidelines for developing science-based strategies for landscape-scale mitigation of a variety of resources, including cultural resources (Clement et al. 2014). One of the major themes of this document is the need to develop a plan for protecting and managing resources from the outset so that mitigation can move from a reactive process to a proactive one that promotes greater predictability and more efficient use of time, energy, and money. Archaeological work under the NHPA at this point is still largely reactive. Most efforts are planned, conducted, and assessed on a site-by-site or project-by-project basis with little direct or formal consideration of a broader or a longer-term consideration of cumulative impacts on archaeological resources. We argue that the same kinds of data useful for conducting regional scale analyses described above are also useful for setting priorities and planning efforts to improve the management of archaeological resources.

Most archaeologists working in the compliance world recognize that assessments of archaeological resources under the NHPA and related laws are usually a coarse filter. Sites are typically evaluated for the National Register of Historic Places (NRHP), which results in a “yes or no” assessment of eligibility where a no is often seen as a “death sentence” for those resources that do not make the cut (Sebastian 2009:96). This has led to a “play-it-safe” attitude where a great many sites with redundant attributes are considered potentially NRHP eligible under Criterion D: likely to yield, information important in prehistory or history. A number of scholars have suggested that what is needed, in part, is a better way to further evaluate the values associated with specific archaeological resources in a broader context (e.g., state historic context documents). Proposals for addressing this issue have included the creation of categories of eligibility that reflect different kinds of resource values and potential (Sebastian 2009) or alternative mitigation strategies focused on assessing appropriate actions for individual archaeological resources in light of a broader agenda. The priority planning approach we describe here was inspired by similar avenues of thought and also by recent efforts toward natural resource conservation planning conducted in ecology and other resource management fields (e.g., Cushman 2002).



Figure 3. The current distribution of archaeological priority areas (outlined in black) defined by Archaeology Southwest for southern Arizona.

Within the field biological conservation it is common practice for regional planning to begin with the definition of specific conservation “targets” (particular species, communities, or ecosystems in need of protection) for which quantitative goals for protection can be set. From this, spatially explicit areas that “capture” those targets can be identified, the idea being that the protection of those areas would help reach the specific quantitative goals for conservation. Such areas can then be prioritized for special attention when directing conservation actions to reduce adverse impacts and to promote natural processes that will help sustain the defined targets. Targets further serve as surrogates for a broader suite of resources in that the long-term protection of targets will often result in the protection of the full complement of species, communities, and ecosystems in a region (Pressey 2004). The approach we advocate here builds on these biological conservation efforts which have proven successful in managing and planning for impacts on biodiversity in many places.

The goal of the archaeological priority planning process is to develop a platform for systematically identifying, describing, and evaluating places in need of protection (which we call priority areas) using both available cultural

resource data and expert knowledge. Identifying cultural resource priority areas helps meet the needs of land managers by providing spatially explicit information on places which contain the most important cultural resources and provide the best opportunities for protection actions. For example, these data can be used to provide regionally contextualized assessments or justification for new preservation designations such as National Monuments, National Conservation Areas, or administrative designations such as the Bureau of Land Management’s Areas of Critical Environmental Concern (ACEC). Further, the identification of these priority areas serves a number of other purposes including facilitating ongoing engagement with local, state, and federal partners and private land owners in developing site and landscape specific protection actions (e.g., site purchases, preservation easements, etc.). Cultural resource priority planning moves beyond site-specific assessments of NRHP eligibility and provides landscape-scale (or even regional-scale) perspectives on the relative importance of cultural resources which can increase the probability that cultural resources will be considered during the early stages of local, state and federal land use planning.

Laurenzi and colleagues (2013) provide a detailed overview of the planning process. Briefly, the priority planning process involves gathering archaeological site data for the relevant area/period/topic and then using those data to guide individual interviews or workshops of recognized experts with specific on-the-ground knowledge of the resources at hand. In these expert workshop/interviews, resource managers and researchers are asked to explore the available data and provide their perspectives on specific archaeological sites or larger landscapes that have particular needs or opportunities for preservation or specific site protection actions. This process is conducted in real time using GIS software to draw the boundaries around areas recommended by these experts (priority areas) and to write detailed descriptions of the resource values used to define those areas. These priority areas are later finalized after additional land-ownership research and, in some cases, updated site condition assessments. The result is a map with a series of polygons and associated detailed descriptions that represent our specific recommendations for archaeological priorities in a given area (Figure 3). We do not suggest that this process should replace the Section 106 process or any other site protection laws. We do suggest, however, that the definition of such priority areas can and should help guide our decisions in how and when to allocate resources (time, money, and energy) toward protecting archaeological sites and landscapes. In short, the priority planning process provides a means for assessing individual archaeological resources at a broad spatial scale based on both available data and expert knowledge. Further, priority planning provides a current distillation of expert knowledge and opinion on the distribution of important resources which can be used to inform management decisions.

What do we then do with these priority areas? The ultimate goal of this process, as suggested by the Department of the Interior document cited above (Clement et al. 2014), is to make archaeological resource management a more proactive process (see Barker 2009). By having a plan in place prior to (rather than in response to) the initiation of actions that necessitate mitigation (such as roads, transmission lines, development, etc.) archaeological information can be taken into account *before* such projects are planned and alternatives are drawn. In addition, conservation efforts on private lands through easements and land purchases can focus on these priority areas, creating contiguous “archaeological preserves” that cannot be developed without invoking eminent domain. This model has been used for many years for assessing wildlife and wetland resources, for example, where such resource considerations are frequently used from the outset to define and assess potential impacts of a project. In most cases, archaeological resources are not evaluated until alternative corridors have already been chosen. Thus, archaeological resources have primarily been a factor when making

decisions about which alternative to select or minor adjustments to project boundaries whereas other kinds of resources have more often played a role in the initial project planning. We argue that the priority planning process described here provides a model for integrating archaeological information and expert knowledge of archaeological resources in the initial stage of planning of large-scale undertakings (in particular large infrastructure projects like pipelines, roads, and transmission lines). Such an effort also has the potential to benefit developers by allowing them to not waste resources planning undertakings in areas/routes that would potentially require costly mitigation.

The priority planning process described above is explicitly data-driven. Our ability to assess sites in a broader context depends, in large part, on our ability to create a high quality compilation of information about archaeological resources at large scales. We have found in our own planning efforts that the kinds of synthetic databases described here (and indeed, the SWSN database itself) provide excellent platforms for identifying key resources in a broader context. As this suggests, such research databases improve our ability to manage archaeological resources by allowing us to assess individual resources in light of the larger universe of data and knowledge available. At the same time, the reverse is also true. In our own work, we have found that the priority planning process and in particular the distillation of expert knowledge relating to archaeological resources has provided new information important to our research and improved information on the sites/areas included. We see one of the major benefits of the priority planning process as this recursive relationship between research and preservation efforts.

RESEARCH, SYNTHESIS, AND THE NATIONAL HISTORIC PRESERVATION ACT

The NHPA has had a huge impact on our ability to synthesize information about life in the past across the Southwest and the United States as a whole. The SWSN project example directly illustrates the impact of the NHPA on data availability and quality. Without the NHPA and related resource management laws we would be left with a far sparser picture of social connections across the region. Many new and exciting interpretations of regional-scale processes in the Southwest would not have been possible. In the same way that the NHPA has done much for archaeological research, we suggest that synthetic research has the potential to help us develop new and creative approaches to complement the NHPA. Our priority planning approach relies, in part, on synthetic research databases to characterize the needs and opportunities for preservation in a larger context. This process has the potential to help us move beyond site- or project-level considerations of preservation and ar-

archaeological resource management toward a proactive and comprehensive model. In an ideal world, research and preservation efforts should go hand in hand.

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FIFTY YEARS OF STRESS AND SUCCESS: THE NATIONAL HISTORIC PRESERVATION ACT IN ARIZONA

Ann Valdo Howard

ABSTRACT

The expanded opportunities for research resulting from the implementation of the National Historic Preservation Act (Public Law 80-665; 45 U.S.C. 300101 et seq.) over the past 50 years have transformed our knowledge of Arizona's past. Implementation of the NHPA in Arizona has not always been smooth and it continues to evolve, as new challenges and opportunities are identified, and new trends and issues concerning historic preservation come to the forefront. This paper provides an overview of the history of the implementation of the National Historic Preservation Act (NHPA or Act) in Arizona, summarizing its beginnings at the state level with the State Historic Preservation Office and highlighting how various sections of the NHPA—particularly Sections 106 and 110—have been operationalized and have changed through the decades. Cultural resource-related matters in Arizona have influenced national policies such as those addressed in National Register Bulletin 38 (Parker and King 1998), which deals with Traditional Cultural Properties, as well as general archaeological research, public archaeology education, tribal collaboration, and site stewardship. The NHPA has fostered archaeological, historical, and ethnographic research in our state by requiring cultural investigations for federal projects that have the potential to adversely affect significant cultural properties. This requirement has resulted in a better focus on research priorities and a broader scope of review of proposed research.

THE NHPA IN ITS HISTORICAL CONTEXT

This paper focuses on the history of the implementation of the NHPA in Arizona, and how it continues to evolve, as NHPA compliance-driven projects frequently present new challenges, as well as new avenues for collaboration and investigation. The growth in the number of NHPA compliance projects over the past 50 years has resulted in expanded opportunities for research, and has greatly transformed our knowledge of Arizona's history, as evidenced by the papers in this volume.

The NHPA has close ties to our nation's other historic preservation programs, the history of which is long and varied. A full discussion of all cultural resources laws is beyond the scope of this paper; however, beginning with the Historic Sites Act (1935; 16 U.S.C. 461-467), it was established that "it is a *national policy to preserve for public use* historic sites, buildings, and objects of national significance for the inspiration and benefit of the people of the United States (emphasis added)." The Historic Sites Act endowed the Secretary of the Interior with broad powers to implement a national historic preservation program that focused on nationally significant sites, regulation of the removal of archaeological materials from federally owned land, acquisition of privately owned historic properties, preservation of historic sites on federal land, and assistance to a number of specific federal agencies with programs that might adversely affect historic properties. Regardless of these new efforts to save important archaeological and historical sites and materials, it was recognized that large numbers of important cultural resources that did not reach the level of national significance were lost as a result of federal involvement.

As a result of this continued loss of cultural properties that were clearly important on less than national levels, the NHPA of 1966 was enacted and effectively became the basic federal law governing the preservation of archaeological and historical resources of national, regional, state, and local significance. This act became the legal basis for the primary components of the federal government's historic preservation program, e.g., the National Register of Historic Places (NRHP or National Register), certification of local governments, creation of the Advisory Council on Historic Preservation (ACHP), creation of State Historic Preservation Programs as administered by State Historic Preservation Officers, and consultation with tribes and the public. Authority to

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administer the varied aspects of this monumental law was vested with the Secretary of the Interior, through the National Park Service (NPS), which already had vast experience through NPS ownership and management of many large and significant cultural sites. Thus, the NPS was given the responsibility of developing guidelines and standards for implementation of many of the numerous sections of the NHPA.

With the execution of this Act, federal agencies were given a mandate to consider potential impacts that their projects could have on cultural resources that were listed on the NRHP, also called “historic properties.” In addition, Section 101 of the Act, which required states to form State Historic Preservation Offices (SHPOs) to coordinate statewide historic preservation programs, was significant in vesting with the state government, for the first time, concern for the state’s historic properties. This new requirement resulted in systematic inventories of historic properties, nomination of properties to the NRHP, development of statewide Historic Preservation Plans, the provision of technical advice and assistance to federal agencies, and the development of new and varied programs to educate the public about the importance of preserving their state’s unique cultural heritage resources.

The early history of the NHPA’s implementation in Arizona is somewhat foggy because scant information from the late 1960s and 1970s has been preserved. However, part of this historical context in Arizona involved an antiquities act that was passed by the State Legislature in 1927, although this law was nullified by the U.S. Attorney General due to significant flaws (e.g., giving jurisdiction over federal land as well as state land). In 1960, these issues were fixed and the law was strengthened as the Arizona Antiquities Act (AAA). A full discussion of this state law and its implementation, as well as the other state historic preservation laws that were enacted during the 1950s – 1990s, is not germane to this paper. Suffice it to say that compliance with the AAA, in particular, was responsible for the initiation of the Cultural Resources Management Department at the Arizona State Museum, the staff of which undertook hundreds of survey and data recovery projects during this time. Although the Cultural Resources Management Department at the Arizona State Museum was active in the 1970s and beyond in conducting archaeological projects in compliance with the Arizona Antiquities Act, it is unclear how many of these endeavors also had a federal nexus. However, it is clear that the review of federal compliance projects was relatively rare during the early years of the NHPA, and the primary focus of the Arizona SHPO was on nominating historic properties to the National Register and awarding historic preservation grants for “bricks and mortar” projects involving historic buildings. It was not until the ACHP promulgated their regulations (36 CFR Part 800) for implementing Section 106 of the NHPA in 1979 (Advisory Council on

Historic Preservation, 1979) that compliance review really started in earnest.

Today, the Arizona SHPO staff handles thousands of compliance reviews each year under Section 106 of the NHPA alone. In fiscal year (FY) 2014–2015, SHPO staff reviewed over 2,500 compliance projects, roughly 73 percent of which were for federal Section 106 projects; the remainder were reviewed primarily under the State Historic Preservation Act. In terms of SHPO staff time, compliance review constitutes over 50 percent of all hours spent on the SHPO’s various program areas. Through the decades, we have witnessed Federal compliance projects reviewed under the NHPA become increasingly complex, involving multiple types of impacts to historic properties, including properties of religious and cultural significance to tribes. Projects have also become more controversial and contentious, with lawyers and politicians entering into Section 106 consultations with greater frequency.

EARLY HISTORY

As previously mentioned, the beginning of Arizona’s effort toward a statewide historic preservation program is poorly documented. Fortunately, Jim Garrison, Arizona’s recently retired State Historic Preservation Officer, was also a consultant to the SHPO in the mid-1970s, and much of the following information about the early history and development of the Arizona SHPO described below comes from Garrison (2000). In addition, various issues of the *Arizona Preservation News*, a newsletter written by SHPO staff from 1970 through 1979, also supplied information on the Arizona SHPO’s early years. Finally, historian Jay Price, provides some information about the beginning of the SHPO in Arizona in his 2004 book focused on the history of Arizona State Parks.

Garrison (2000:2) stated that the program in Arizona began with a one-sentence memo from the director of Arizona State Parks dated October 14, 1966. This memo simply said: “I have sent for a copy of the Bill.” The “Bill” referred to would be signed into law by President Lyndon B. Johnson the very next day, October 15, 1966, and would become the National Historic Preservation Act.

Jay Price (2004:46) further states: “The Arizona State Parks Board was initially ambivalent about taking on this responsibility, but [then-Arizona State Parks Director Dennis] McCarthy was not and helped persuade Governor [Samuel] Goddard to assign him the role of the state historic preservation officer,” as directed by the NHPA for all states. In late 1967, Governor Goddard appointed McCarthy as the official “state liaison officer” to represent Arizona in carrying out the historic preservation program outlined in the NHPA legislation. Price (2004:46) indicates that McCarthy had three primary responsibilities as the state liaison officer: (1) nominate cultural properties in Arizona to the NRHP; (2) coordinate a grants-in-aid program for passing federal funds

from the NPS to assist with the preservation of public and/or private historic sites; and (3) oversee these two processes to ensure their compliance with the NPS's guidelines and standards. In 1969, the Arizona SHPO received roughly \$11,000 from the NPS to operate the historic preservation program. In contrast, the Arizona SHPO's apportionment from the NPS in 2015 was about \$857,000.

Price (2004:46) states that McCarthy, as the Director of Arizona State Parks, was recognized as the official liaison between the state of Arizona and the National Park Service. However, the brunt of the responsibility for implementing the NHPA fell to the Assistant Director of Arizona State Parks at that time, Wallace Vegors. In 1969, the Arizona State Parks Board had reassigned the position of "state liaison officer" to the Assistant Director of State Parks to oversee the administration of the historic preservation program and the state's compliance with the NHPA. Very little information has been preserved concerning McCarthy's and Vegors' service and accomplishments as the state liaison officer; however, Vegors was the first to be referred to as the state's "Preservation Officer." Price (2004:46) states that historic preservation during these early years was not well supported and developed slowly. The prevailing attitude at the time was that historic preservation was "anti-progress," and Vegors stated that "if it was worth saving, the National Park Service would have already done it" (Price 2004:46). Support for historic preservation during these early years was founded mainly in historical societies.

In 1970, Arizona State Parks created the position of Historic Sites Preservation Officer and hired Robert Fink from Colorado to fill it. After Fink, in late 1972, the Arizona State Parks Board appointed Dorothy Hall, an archaeologist, as the Historic Sites Preservation Officer. Hall worked with two employees: Marjorie Wilson was hired in 1974 to coordinate the National Register Program, and Jim Garrison was hired in 1975 as a contract historical architect to review historic preservation grants. In late 1976, Hall hired Frank Fryman as the first compliance archaeologist for the SHPO. In 1974, the title of state liaison officer for the Director of State Parks was renamed as the State Historic Preservation Officer. When Mike Ramnes became Director of State Parks in 1976, however, he did not want to be the State Historic Preservation Officer, and thus Hall received the title and responsibilities of the SHPO at that time (Figure 1).

In 1979, Jim Ayres was hired as the State Historic Preservation Officer and served for two years. Prior to Ayres's term, most SHPO staff positions were hired as outside contractors. Ayres was responsible for changing these contractor positions to state employee positions, further strengthening the state's commitment to meet the spirit and intent of the NHPA. As a result, within his first year, the staff of the SHPO had grown to five employees.

Ann Pritzlaff was appointed as the next State Historic Preservation Officer from 1981 to 1983. Pritzlaff was instrumental in the passage of the 1982 State Historic Preservation Act (Arizona Revised Statutes 41-861 et seq.). She possessed a Master's degree in historic pres-



Figure 1. Photograph of early SHPO staff (circa 1977). From left to right: Mary Jane Gregory; Jim Woodward; Jim Garrison; Frank Fryman; Patricia Bergthold; Marjorie Wilson; Dorothy Hall; unknown. Photographer unknown.

ervation and, following her term in the Arizona SHPO, went on to be active in the Colorado historic preservation community. She later served on the national board of the ACHP.

In the early 1980s, then-Governor Bruce Babbitt developed an interest in civic planning involving many different issues, including archaeological preservation (Price 2004:115). He implemented his vision through establishment of the Office of Economic Planning and Development (OEPAD). In 1983, Babbitt appointed Donna Schober—a lawyer and legislative liaison for the OEPAD—as the State Historic Preservation Officer. While in OEPAD, Schober had already started working on various archaeological preservation issues for Babbitt. She served as the new SHPO until 1985.

Price (2004:116) states that task forces and advisory groups were a hallmark of the Babbitt administration, and one of the first task forces that he formed in 1980, with assistance from Schober in her role as OEPAD liaison, was a Task Force on Historic Preservation. Governor Babbitt was upset about looting of Arizona's heritage resources, and became especially concerned after visiting the prehistoric ancestral Hopi sites of Homolovi in northeastern Arizona. The devastation caused by pothunters at these sites was the impetus for Governor Babbitt to form the Homolovi Ruins State Park (now called Homolovi State Park) and the Archaeology Advisory Group (Figure 2).

Governor Babbitt challenged the Archaeology Advisory Group to come up with solutions to the archaeological site-looting problem; thus, in consultation with the SHPO, the Archaeology Advisory Group initiated the Arizona Site Steward Program, as well as Arizona Archaeology Week, which later became Arizona Archaeology and Heritage Awareness Month. These new stewardship programs were focused on raising public awareness of vandalism and looting and the impact that these activities were having on the state's irreplaceable cultural resources.

In 1982 Schober hired Dr. Shereen Lerner, who later became the State Historic Preservation Officer under Governor Mecham's appointment in 1985 and served until 1992. Lerner, an archaeologist, further strengthened the state's public archaeology education programs, recognizing the importance of public awareness and sensitivity toward the state's non-renewable heritage resources. She also was the first State Historic Preservation Officer to devote major funding from the SHPO's federal budget to support public education programming. Many of Arizona's successful and model public archaeology endeavors, e.g., Arizona Archaeology Week and the Arizona Site Steward Program, were started under Lerner's tenure, and these programs helped satisfy the NHPA mandate for SHPOs to educate and involve the public in historic preservation. This public archaeology programming won many local, state and national awards, including the U.S. Department of

Interior's "Take Pride in America" award in 1988 for the Arizona's Archaeology Week program. Additionally, the Arizona Site Steward Program became a national model for site stewardship in partnership with state and federal agencies.

Jim Garrison was appointed by Governor Fife Symington as the State Historic Preservation Officer in 1992 and retained the position for nearly 24 years. He was the longest-serving State Historic Preservation Officer in Arizona's history, and weathered some of the toughest compliance issues in Arizona since the inception of the NHPA. Garrison retired as the SHPO in May 2016 and, at the time of the printing of this publication, no new SHPO has been appointed by Governor Ducey. Figure 3 shows the latest five of six Arizona SHPOs.

In December of 2015, the SHPO staff moved into the historic (1893) Evans House, a true Queen Anne-Victorian home, in downtown Phoenix. Figure 4 shows the current SHPO staff in their new office.

The above summary was intended to provide perspective on the emergence of the NHPA in Arizona. The remainder of this article focuses on some of the more crucial aspects of the law, as Sections 106 and 110 have had some of the biggest impacts on the growth of historic preservation activities and cultural research in Arizona.

NHPA COMPLIANCE HITS IT BIG

In 1971, President Nixon enacted Executive Order (EO) 11593 (as detailed at 36 FR 8291, 3 CFR, 1971-1975 Comp., p. 559, National Archives Electronic document <https://www.archives.gov/federal-register/codification/executive-order/11593.html>, accessed



Figure 2. Photograph of Governor Bruce Babbitt speaking at an event at the Homolovi archaeological sites (now Homolovi State Park) in northeastern, Arizona (circa 1986). Photographer unknown.



Figure 3: Latest five of six Arizona State Historic Preservation Officers -- left to right: Jim Ayres; Shereen Lerner; Donna Schober; Dorothy Hall; Jim Garrison. Missing: Ann Pritzlaff. Photographer unknown; date unknown.

11/03/2016), entitled "Protection and Enhancement of the Cultural Environment," to support the provisions of the NHPA. Although brief, its three sections on policy and the responsibilities of federal agencies and the Secretary of the Interior were clear, and reinforced the purpose of the NHPA. This EO had crucial implications for the practice of historic preservation in the state. For example, in the years prior to the ACHP's promulgation of the Section 106 regulations in 1974, EO 11593 was mentioned more frequently in the SHPO's newsletters than the NHPA.

The first mention of anything closely resembling compliance review in the *Arizona Preservation Newsletter* (APN) appears in a 1973 issue when it is mentioned that the ACHP helps federal agencies "evaluate the effect" of projects (Arizona Preservation News, April 1973). Compliance is not mentioned in any further detail until the August 1975 newsletter after the ACHP enacted its Section 106 regulations (Arizona Preservation News, August 1975). The newsletter excerpt again discusses the ACHP's review power; however, the role of the SHPO in this process is not mentioned.

The purpose of the Section 106 regulations (36 CFR Part 800, National Archives Electronic document <http://www.achp.gov/regs-rev04.pdf>, accessed 11/9/2016) was to require federal agencies to take into account the impacts that their projects, or "undertakings," could

have on historic properties, in consultation with relevant stakeholders or consulting parties. The Section 106 regulations laid out a process by which federal agencies are required to consult with SHPOs, tribes, the public, and other interested parties. In 1976, the U.S. Congress extended the Section 106 review process to include cultural resources that were eligible for listing on the NRHP in addition to those already listed on it. This opened up the floodgates for projects to require compliance review, and Frank Fryman was hired by the SHPO as federal projects were more routinely submitted directly to the SHPO for compliance review and comment. The first compliance cases to be explicitly mentioned in the APN were briefly discussed by Fryman in the October 1976 issue. He states that 27 compliance projects were reviewed "by the ACHP, in consultation with the SHPO" (Arizona Preservation News, October 1976:5). Some of these early compliance projects in the mid-to-late 1970s included various reaches of the Central Arizona Project (CAP), the Palo Verde Nuclear Generating Station, Interstate 19, Orme Reservoir and Roosevelt Dam, and numerous Forest Service land exchanges and timber sales, as discussed in subsequent articles in this volume.

Also, in the mid-to-late 1970s, most archaeologists, historians, and other historic preservation specialists were employed primarily at universities or colleges. The passage of the NHPA, and particularly the 1976 amend-



Figure 4. SHPO Staff as of April, 2016 -- from left to right: Jim Garrison; Eric Vondy; Mary-Ellen Walsh; David Jacobs; Kris Dobschuetz; Alyssa Gerszewski; Bob Frankeberger; Jim Cogswell; Ann Howard; Joe Roth; Bill Collins. Missing: Vivia Strang.

ment to the Act, led to major changes in employment trends in historic preservation fields. Within a few years, vast numbers of archaeologists, historians, historical architects, and others were employed in the private sector in the field of cultural resource management (CRM). The 1976 amendment resulted in more projects that required archaeological work, making it possible for more archaeologists to practice archaeology. Unlike academic positions, CRM jobs generally do not require a Ph.D. As a direct result of the implementation of the NHPA, therefore, private archaeological consulting firms have flourished.

In 1980, Section 110 was added to the NHPA, mandating further requirements for federal agencies, such as the need to establish internally staffed historic preservation programs and a directive to inventory and actively manage historic properties under their control. At that time, many federal agencies saw the wisdom in hiring cultural resources staff, particularly archaeologists, to handle the requirements for survey and other investigations related to their Section 106 workload and Section 110 inventory needs.

Additions to the NHPA between the 1970s and the 1990s resulted in major changes to how archaeology

was conducted in Arizona, with the requirement for federal agencies to devote funding for identification, evaluation, and mitigation of adverse effects to archaeological historic properties. Although highway salvage archaeology in Arizona began before NHPA-driven compliance undertakings, large highway and reclamation projects, such as the Interstate 10 expansion through Phoenix, the CAP, and many others now require data recovery programs. These projects resulted in the collection of massive amounts of data that changed how archaeological investigations were conducted, as interdisciplinary approaches became more common and resulted in new and more comprehensive interpretations of Arizona archaeology. For example, these NHPA-mandated data recovery projects and many others radically broadened what we know about the Hohokam, resulting in new insights about prehistoric indigenous populations in southern and central Arizona. As a result of activities associated with the Bureau of Reclamation's CAP alone, over 5,500 sites were identified since the 1980s, demonstrating the significant growth in our collective knowledge about the archaeological record in the project area. This growth is entirely attributable to the requirement for federal agencies to comply with the NHPA. Arizona

was regarded as a leader in forging partnerships with federal agencies for these large compliance projects, resulting in creative approaches to mitigation that went beyond the traditional “excavate everything” within the project area. For example, the Roosevelt Lake portion of the CAP focused on a thematic approach to choosing a sample of sites for data recovery, which resulted in a synthesis that integrated all of the sites that were treated into a unified context study.

Another hallmark of these early, large-scale, compliance projects in Arizona was the recognition that it was important to “give back to the public” since federal tax dollars were being spent on conducting these studies. This new enlightenment resulted in the inclusion of public involvement programs into many excavation projects, with public-oriented activities ranging from archaeological site tours; to exhibits on the archaeology of the area in local museums, libraries, and cultural centers; to public talks in local libraries and other venues; as well as public presentations to avocational archaeology and history organizations. Arizona led the way in creating new ways to involve the public. In turn the public reacted very favorably to these activities—turnout by the public at these archaeology programs was overwhelming, with citizens braving bad weather and terrain to participate.

This critical span also witnessed an increased focus on interdisciplinary research as a component of NHPA compliance-driven projects. Ethnographic studies, oral histories, and archival research all added new personnel and new perspectives to archaeological research, as did the incorporation of geomorphological, geological, hydrological, and many other scientific studies into fieldwork, laboratory analyses, and research interpretations.

NHPA TRIBAL CONSULTATION REQUIREMENTS

Another major amendment to the NHPA was added in 1992 to help address growing stresses between Federal agencies and Tribes in the implementation of NHPA compliance-driven undertakings. The intent of this amendment was to provide for increased consideration of, and protection for, properties that were significant to Native Americans. The 1992 amendment created Tribal Historic Preservation Officers that assumed the functions and responsibilities of the SHPO on tribal lands. In addition, and most significantly, traditional religious and cultural properties could now be determined eligible for inclusion on the National Register, and the importance of consultation with Native Americans in the Section 106 process was reemphasized.

From the SHPO perspective, more than any other amendment to the NHPA, this addition has resulted in some of the most significant changes to the implementation of the NHPA in Arizona. It resulted in increased collaboration with tribes and with agencies engaging

tribes in unprecedented ways. Some federal agencies have incorporated (or will soon incorporate) tribal concerns into field methodologies, and are actively working with tribes to generate multi-perspective research interpretations. Many agencies also are collaborating with tribes outside of the Section 106 consultation process, integrating tribal issues and knowledge into general land-use planning processes and studies.

Although progress has been made in the past 24 years, the tribal consultation process has not been an easy journey for either tribes or federal agencies. Consultation efforts between federal agencies and tribes were initially difficult as both groups established new relationships and learned to work within the Section 106 requirements. Additionally, some projects have adversely affected important religious and cultural properties, or Traditional Cultural Properties, for some tribes such as the San Francisco Peaks, Mt. Graham, the Grand Canyon, the Piñaleno Mountains, and many other sacred places. In the tribal consultation arena, much more can and should be done to integrate tribal concerns into the Section 106 process. The vast majority of questions and complaints that the SHPO receives about the Section 106 consultation process involve the issue of tribal consultation, particularly the identification and evaluation of properties that are important to the tribes (Traditional Cultural Properties, traditional use areas, and ethnographic/cultural landscapes). It is often difficult for tribes to divulge sensitive information on properties that have religious and cultural significance to them. Yet federal agencies believe they need this information to evaluate the National Register-eligibility of such properties, and keep asking for it, over and over again. These requests have resulted in strained interactions between tribes and some federal agencies, jeopardizing the trust that should exist between them.

In an effort to foster more meaningful consultation between agencies and Tribes in Arizona, the SHPO has produced written guidance (SHPO Guidance Point No. 8 [2008] and SHPO Guidance Point No. 9, [2009]) for federal and state agencies for consulting with tribes. This guidance supplements and builds upon that from the National Park Service in Bulletin 38 (Parker and King 1998), the Advisory Council on Historic Preservation (2012) and the National Association of Tribal Historic Preservation Officers (2005). The SHPO has also sponsored multiple workshops on Traditional Cultural Properties. For example, in 2015, in co-sponsorship with the Arizona Department of Transportation, the US Forest Service, and the Cocopah Indian Tribe, the SHPO coordinated a workshop that focused on government-to-government consultation with tribes, offering agencies and tribes the opportunity to discuss needs and perspectives that will contribute to best practices and integrated research projects and interpretations. The workshop was well attended, with almost 200 participants from federal and state agencies, the private sector, and tribes through-

out the state. Participant evaluations of the workshop were overwhelmingly positive. A primary outcome of the workshop is the anticipated development of an on-line, government-to-government consultation toolkit tailored to agencies and tribes in Arizona.

At the national level, the historic preservation community is awaiting new guidance on Traditional Cultural Properties in the revised National Register Bulletin 38 (Parker and King 1998). It is also hoped that the National Park Service will change their National Register process to better address the evaluation of traditional cultural landscapes. It remains to be seen how these national directives, once initiated, will influence Section 106 and 110 consultation efforts in Arizona.

INTEGRATING SECTION 106 WITH THE NATIONAL ENVIRONMENTAL POLICY ACT

Another stressor in the implementation of the NHPA in Arizona has been the ACHP's 2004 amendments to the Section 106 regulations that provided encouragement for agencies to coordinate or combine National Environmental Policy Act (NEPA) and Section 106 review and consultation processes. The purpose of this amendment was to save time and funding in complying with two separate laws, both of which had requirements for the consideration of impacts to cultural resources. It was also hoped that the public would be better involved in agency decision-making as the federal agencies could use the public scoping processes found in NEPA for Section 106 consultation purposes. In addition, the White House Council on Environmental Quality (CEQ) and the ACHP recently published a detailed guidance document entitled "NEPA and NHPA: A Handbook for Integrating NEPA and Section 106" (White House Council on Environmental Quality and the Advisory Council on Historic Preservation, 2013). The intent of using the procedures and documentation required by NEPA to comply with Section 106 is to align the two processes so that compliance with both laws is "more efficient" and "results in improved public understanding, and leads to more informed decisions" (White House Council on Environmental Quality and the Advisory Council on Historic Preservation 2013:4). As a result of this guidance, coupled with pressure from project proponents to speed up the process, Section 106 compliance projects are increasingly being interwoven into NEPA processes and governed by NEPA timelines.

The SHPO has observed that this intermingling of processes often weakens various consultation aspects of the NHPA, as NEPA schedules can and often do dictate the length and timing of the consultations with the relevant parties. NEPA-driven timelines have led to new problems as the Section 106 process is supposed to be completed before a federal agency issues a final

decision (i.e., a Record of Decision) under NEPA – this results in rushing Section 106 consultations, especially with tribes, and often short-shrifts the consultation process. Additionally, agencies should use Section 106 consultation results to inform the definition and selection of alternatives under the NEPA process, something that does not happen nearly as frequently as it should. Finally, many agencies are applying NEPA procedures and analyses inappropriately to the Section 106 process. For example, many agencies assume that a Categorical Exclusion (CATEX) under NEPA is also an exclusion under Section 106; in reality, however, many CATEXs qualify as undertakings requiring Section 106 review.

Too frequently the SHPO receives complaints from Tribes, in particular, as well as other consulting parties, that this practice diminishes the emphasis on, and duration of, consultation with them. For the continued coordination and/or substitution of NEPA and the NHPA to really work as was intended by the ACHP and the CEQ, federal agencies will need to start the Section 106 consultation process much earlier, develop thorough communication plans that maximize consultation opportunities with consulting parties and the public, and better integrate Section 106 consultation findings into the development of NEPA analyses.

A WORD ABOUT CREATIVE MITIGATION

One of the successes of the implementation of the NHPA in Arizona has been a significant new trend in Section 106 compliance projects for the application of creative or non-traditional mitigation measures to help resolve adverse effects on historic properties. To date, the vast majority of these creative or alternative mitigation activities have involved working with Tribes to minimize adverse effects to Traditional Cultural Properties. These new endeavors are helping to reduce some of the stresses between federal agencies and Tribes that have been created by NHPA compliance-driven projects. Many federal agencies are working closely with tribes to find sensitive ways to help offset the damage of undertakings to spiritual, visual, auditory, and other religious and cultural values held by the tribes. Some alternative mitigation measures negotiated in the last decade include establishing tribal nurseries for sacred plants impacted by a project; painting cell/microwave towers in non-reflective paint; saving white clay deposits encountered in construction for tribes; synthesizing traditional ecological and indigenous knowledge systems into research designs and data recovery plans, resulting in parallel perspectives with western science; pursuing National Register nominations of Traditional Cultural Properties to recognize the importance of these places for tribes; and developing interpretive and educational programs for tribal youth.

The SHPO has heard many positive comments from Tribes about the implementation of these creative measures, and we all look forward to the successful application of even more such programs. The development of such treatments has not always been easy, however. At times, Tribes have requested that archaeological sites that are eligible for the NRHP under Criterion "d" (information potential) not be subjected to traditional data recovery (i.e., collection, excavation, analysis, interpretation, and publication). Instead, they have requested that some other creative mitigation measure, such as those mentioned above, be applied off-site. To date, the Arizona SHPO has disagreed with this approach, as we believe that creative mitigation should not be conducted in lieu of traditional archaeological data recovery at sites that are going to be adversely impacted. However, archaeologists need to be aware of this increasing trend and try to get ahead of the curve by assisting in the development of innovative mitigation measures that address traditional values and incorporate traditional knowledge, while also recovering data on the scientific or "Criterion d" values of these important heritage resources.

FUTURE CONSIDERATIONS OF NHPA IMPLEMENTATION

As we look to the future of NHPA implementation in Arizona, we can expect to see compliance projects become even more complex as the following issues come to the forefront:

- 1) Cultural landscapes and tribal values;
- 2) Integration of tribal perspectives and knowledge into research designs, fieldwork, analysis, and interpretation;
- 3) Rapidly dwindling and increasingly expensive curation space;
- 4) The request to use creative mitigation measures in lieu of standard data recovery programs;
- 5) Continued reductions in federal agency funding and staff; and,
- 6) Increasing legislative and legal scrutiny of cultural resource projects and laws.

This increasing complexity is not necessarily negative, however, because it should better involve all stakeholders in a compliance process that hinges on consultation, and hopefully leads to new and more innovative and inclusive resolutions and interpretations.

SUMMARY

The passage of the NHPA has significantly changed how archaeology is conducted in Arizona. Although the long history of implementation of the Act, and specifically of Section 106 of the law, has witnessed both stresses and successes during the past 50 years, the

overall impact to the field has been positive. Despite its slow start, and in spite of hiccups along the way, implementation of the NHPA has resulted in the integration (albeit to varying degrees of success) of valuable multi-disciplinary, Tribal, and environmental perspectives into archaeological fieldwork, research and interpretations. And, as briefly introduced above, the future of NHPA implementation holds new and exciting opportunities, as well as challenges, for which we all need to plan.

LIST OF ABBREVIATIONS

ACHP: Advisory Council on Historic Preservation
 APN: Arizona Preservation News
 CEQ: Center for Environmental Quality
 CAP: Central Arizona Project
 CRM: Cultural Resource Management
 EO: Executive Order
 NEPA: National Environmental Policy Act
 NHPA: National Historic Preservation Act
 NPS: National Park Service
 NRHP: National Register of Historic Places
 SHPO: State Historic Preservation Office or Officer
 THPO: Tribal Historic Preservation Office or Officer

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CULTURAL RESOURCE MANAGEMENT IN ARIZONA BEFORE 36CFR800

James Schoenwetter

ABSTRACT

The law that justifies Cultural Resources Management (National Historic Preservation Act) was signed in 1969, but the question of what, exactly and legally, cultural resources were, and how they should be managed, was not resolved until 1972, when guidelines for implementation of the law (36CFR800) were published by the National Park Service. In the interim, guidelines were implied by Executive Order 11593, by the language of NEPA itself, and by the language of the published guidelines for implementation of the National Historic Preservation Act. This was the situation when I was tasked, along with colleagues from Arizona State University, to prepare a research design for the survey and testing of the Midvale Site (AZ U:9:24[ASU]) to identify its significance, to establish its present boundaries, and to characterize its prehistoric occupations. To achieve these goals, a few now-traditional archaeological practices were developed: working within the limitations of a legally enforceable contract; application of data management technology to archaeological information as it was recovered; and use of statistical procedures to resolve a field problem, in contrast to one recognized through laboratory study.

Most who practice Cultural Resources Management (CRM) do not know, or remember, that the term did not originate in historical or archaeological literature – gray or otherwise. The words “cultural resources” were first enshrined in the National Environmental Policy Act of 1969 (NEPA), as passed by Congress. This legislation, often misidentified as the National Environmental Preservation Act, is quite unusual since it recognizes the preservation of named “resources” as the POLICY of our republic. Most legislation is about action, not policy. When cultural resources were included in the language of the act, they were not identified. Thus, it became the responsibility of government lawyers to determine what, legally, cultural resources were and what department of government would be tasked as the “lead agency” responsible for preparing the federal regulations by which the policy would be implemented.

The search for precedent federal law resulted in the conclusion that the intent of Congress was the set of acts starting with and elaborating the federal Antiquities Act, dealing with archaeological sites and historic properties, including the National Historic Preservation Act of 1966. Since the National Park Service was the lead agency responsible for writing regulations relative to those laws, it became responsible for writing the regulations for implementing the preservation of cultural resources...those titled “Code of Federal Regulations 36CFR800.”

Before such regulations were written, however, preservation of cultural resources was the law of the land; it applied to all federal lands, licenses granted by federal agencies, projects supported in whole or in part with federal funds, etc. In 1970 President Richard Nixon issued Executive Order 11593 requiring all federal land-holding agencies to comply with NEPA policy by surveying and reporting all cultural resources occurring on holdings under their jurisdiction. Typically, Congress allocated no funds to accommodate such compliance, so E.O. 11593 was not immediately recognized as a significant concern. Late in 1972, however, the issue came to a head in Arizona.

As the most junior member of the Archaeology Faculty at Arizona State University, I was selected to check on a report of disturbance of archaeological materials during ditching operations at Williams Air Base south-east of central Mesa. I had experience in what was then called “highway salvage” and “reservoir salvage” field work in Illinois and New Mexico and was well aware of federal law relating to archaeological remains. In addition to reporting what I observed at what was subsequently recognized as the Midvale Site to the State Historic Preservation Office (then a new division of Arizona’s State Parks Agency), I spoke with the base’s civil engineer.

James Schoenwetter (1935-2015)/ from 1967-2000 Department of Anthropology, Arizona State University.

To someone in the military, an order given by the President – that is, the Commander in Chief-- is not to be questioned. The President's Executive Order was clearly expected to be obeyed, the only matter of interest was how to make it happen. As the local lead agency involved, the National Park Service (NPS) Arizona Archaeological Center in Tucson was contacted by Williams Air Force Base with the expectation that clear directives would be forthcoming.

Needless to say, that was hardly what happened. Neither the Tucson office nor the National office of the NPS had precedents to guide compliance with these laws. Though an informal set of guidelines had been prepared by the Arizona Archaeological Center (Scoville *et al.*, 1972), regulations had not yet been written for the Historic Preservation Act of 1966 or NEPA. So though E.O. 11593 clearly directed that an archaeological survey of the Williams Base property should be executed, and NHPA required a formal identification of the site's significant qualities, the only legal definition of "significance" was that stated in the NHPA itself.

To make a long story shorter, it fell to me to generate a research design for satisfying the law that was amenable to the Air Force, the local and national offices of the National Park Service and the SHPO within the following ten days. With the help of two colleagues, Sylvia Gains and Donald Weaver, both then doctoral candidates at Arizona State, we prepared the required research design.

Then, I threw a monkey wrench into the process: Such professional identity as I had at that time was as a pollen analyst who, very unusually, focused on the study of sediment samples from archaeological sites. I had never been solely responsible for an excavation project or written up a site report. I was the most junior, non-tenured, member of a small faculty at a department that had as yet produced only a single doctorate in Anthropology. I was confident that I was capable of this project, but I had nightmare visions of burdens I had no way to carry. What if the Air Force decided not to honor the budget I had drawn up? What if the Park Service decided my research plan was faulty when I was half way through? What if the University Administration decided I should be teaching classes on days I was planning to be in the field? What might be the effect if Park Service completed regulations for compliance with NHPA and NEPA before the project was finished and insisted that I change the research design to meet new demands? To protect both Arizona State University and my own professional position, I insisted that the project would not proceed unless a mutually agreeable contract was prepared.

The Air Force had no problem with this, so long as a conclusion date was included. The University was sympathetic to the idea, so long as its lawyers approved. The Tucson office of the Park Service was appalled: they had never previously been party to a contract. Archaeological research was undertaken on the basis of a hand-

shake agreement between archaeologists. So a compromise was drawn up: a Memorandum of Agreement that laid out each party's various basic responsibilities, to be followed in time by a contract prepared by National Park Service's lawyers as approved by ASU, the Air Force, and the Arizona SHPO. It turned out that the contract was not finalized until 15 months after the field and lab work was completed.

The first issue was the survey. I had worked on sites where highway rights-of-way and budgets identified site limits. I had worked on sites in Wisconsin, Illinois and Mexico where the distribution of mounds suggested site limits. I had worked on sites in Arizona and New Mexico where the distribution of architecture made site boundaries relatively clear. I had worked on sites in Illinois and Kentucky defined by caves and rock shelters. But what we had to deal with here were scatters of sherds and lithic debris spread sporadically over dozens of acres. So I asked for help. Emil Haury came to the site from Tucson and we walked quite a bit of it together and talked of how it could be approached.

In the end, we established a controlled grid and sampling system and defined site boundaries within the Base property on a statistical basis. While I strongly defend the scientific value of this methodology, the Air Force was unhappy with it as it created site boundaries that incorporated areas they wished to be free to manipulate (we would now say "impact") without having to worry about mitigating archaeology.

A second issue was that of the subsurface distributions of archaeological remains. Mechanized surface stripping and backhoe trenching within site boundaries was considered inappropriate at the time because of its potential for disturbance, and test pitting over such an area was wholly impractical given the time and budget. We set up a test pits-and-coring program using a statistically adequate sampling plan to simultaneously evaluate the distributions of cultural and natural strata and the types of subsurface artifacts.

Finally, Sylvia Gains established a computerized data management program founded on her experience with a prototype created for an ASU field school.

In sum, working without federal guidelines, we initiated a CRM survey and test before CRM became a business or became the bulk of the way archaeology is achieved in the United States. We set the precedent for the Arizona SHPO's requirement of a written research design for archaeological work; we were among the earliest to employ statistical approaches to dealing with field problems as well as analytic concerns; and we were the first archaeologists in this state to fulfill professional responsibilities through the mechanism of legally binding contractual commitments.

And Oh Yes; we named the principal site at Williams Air Base the Midvale Site, in recognition of Frank Midvale's significant contribution to knowledge of the archaeology of the Salt River Valley (Schoenwetter *et al.*, 1973).

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THE VIEW FROM OUTSIDE: THE IMPACT OF THE NHPA ON ARCHAEOLOGICAL RESEARCH IN THE HOHOKAM PERIPHERY

Richard Ciolek-Torello
Michael Heilen

ABSTRACT

Archaeological research along the peripheries of the large urban centers of the Lower Sonoran Desert region has benefited greatly from the passage of the National Historic Preservation Act. With few exceptions, these areas had received only limited and sporadic attention prior to the passage of the act. Passage of the act coincided with unprecedented growth of the desert urban centers, requiring massive expansion and development of infrastructure. Archaeological research conducted as part of these construction projects has resulted in a wealth of new knowledge, which has overturned old ideas and provided new insights into virtually unknown regions. In this paper we focus on the Transition zone surrounding the Phoenix Basin and the Papaguería southwest of the Phoenix Basin.

INTRODUCTION

The peripheries of the Phoenix Basin benefited significantly from passage of the National Historic Preservation Act (NHPA). With few exceptions, these peripheral areas had received only limited and sporadic attention prior to the passage of the NHPA. Passage of the act coincided with unprecedented growth of the desert urban centers, which required expansion and development of infrastructure. In particular, the need for water and power supplies by a rapidly expanding desert population required large water-conveyance and -storage systems, new and expanded power lines, and flood-control projects. Highway construction was needed to meet the increased recreational demand by urban desert dwellers to access mountain resort areas. Department of Defense (DoD) installations located in peripheral areas also have commissioned substantial archaeological research under the NHPA in order to develop facilities for military training and weapons testing. Archaeological research conducted as part of these development projects has resulted in a wealth of new knowledge that has over-

turned old ideas and provided new insights into virtually unknown regions.

In this paper we focus on two regions of the Sonoran Desert considered to have been on the Hohokam periphery. The first is the Desert Transition Zone, an upland region that includes the Northern and Northeastern Peripheries of the Phoenix Basin and the Tonto Basin. This region lies between the Lower Sonoran Desert of the Phoenix Basin to the south and southwest, the high deserts of the Colorado Plateau to the north, and the forested highlands of the Mogollon Rim to the east. The second is the Western Papaguería, a remote interior desert on the southwest periphery of the Phoenix Basin (Figure 1).

The archaeology of these peripheral areas presents a complicated and often confusing challenge to prehistorians. Their environmental diversity is matched by their cultural and historical diversity. At the same time, these peripheries are important from the viewpoint of interpreting cultural landscapes and reconstructing the prehistory of the Southwest. Over the course of several thousand years, a great many different people representing most of the major cultural traditions of the Southwest were drawn to these areas where they interacted with each other and the environment in diverse ways.

Until recently, the prehistory of the peripheries was interpreted on the basis of their proximity to the Phoenix Basin and a largely Hohokam-centered explanatory model. As early as the 1930s, Gladwin and Gladwin (1933:5) proposed that the Hohokam migrated from their original homes in the Phoenix Basin to colonize the smaller neighboring valleys and surrounding uplands, where irrigation farming was possible and familiar desert resources were available. The Gladwins also ascribed to the view that the Classic period occupation of the peripheries was heavily influenced by what Mc-

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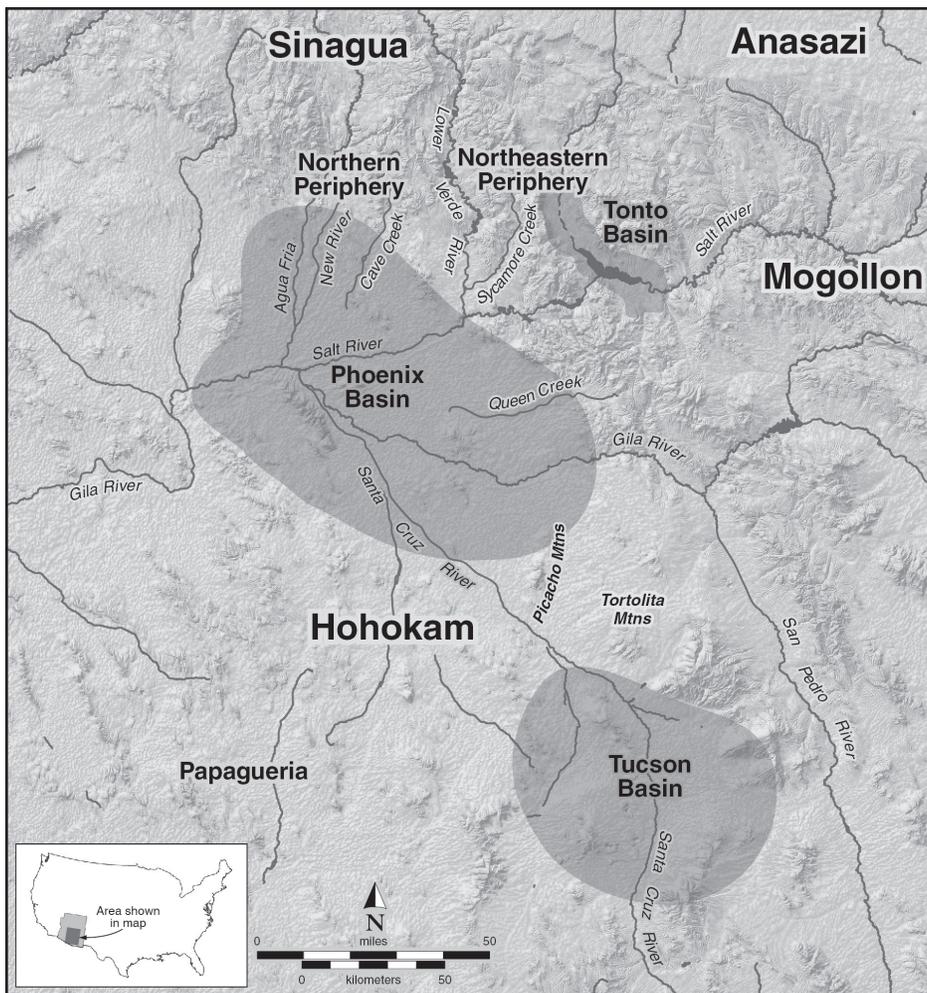


Figure 1. Major cultural areas of central and southern Arizona.

Gregor (1965:346) termed a “peaceful” invasion of the region by Puebloan groups to create the Salado culture. Doyel’s (1978) seminal study at Miami Wash—one of the earliest NHPA-driven projects in the periphery—led to the rejection of this view and the acceptance of cultural continuity between the Hohokam and Salado.

By the late 1970s, Wilcox (1979) had departed from the Gladwin’s view of Hohokam colonization when he developed the notion of a pre-Classic period Hohokam “regional system” to explain the widespread distribution of Hohokam material goods and ritual through exchange associated with ball courts—a view most recently elaborated by Abbott (2000a; Abbott et al. 2007). At about the same time, other archaeologists adopted Wallerstein’s (1974) core-periphery model to explain the relationship between the Phoenix Basin and the peripheries (Wilcox and Shenk 1977). Phoenix Basin was the core area, and areas such as the river valleys north of Phoenix, Tonto Basin, the Tucson Basin, the Papaguería, and elsewhere were considered peripheries.

Whittlesey (1998) pointed out that this concept of core and periphery may superficially resemble Wallerstein’s, but the relationships are not the same. Accord-

ing to Lerner (1984), the core and periphery exist in terms of explicitly defined and dependent economic, political, and social relationships. In the Hohokam case, the core did not maintain political control over the periphery, and it remains unclear what the actual relationship was.

Since the passage of the NHPA, large areas of the periphery have been surveyed, and scores of sites ranging from small farmsteads and compounds to large pit house villages and entire platform mound complexes have been excavated. The wealth of data generated by these studies has allowed us to resolve many pressing issues regarding the prehistory of these peripheral areas at a level of detail rarely available to prehistorians working in any region.

THE PRE-CLASSIC PERIOD

The Northeastern and Northern Periphery

The Lower Verde Archaeological Project (Whittlesey et al. 1998) in particular provided an opportunity to investigate the core-periphery model (Figure 2). At the start of the project in 1992, the lower Verde region remained a virtual archaeological terra incognita and was considered a part of the Northeastern Periphery along with Sycamore Creek, Tonto Basin and Queen Creek (Wood and McAllister 1980). The major drainages north of the Phoenix basin, such as the Agua Fria and New Rivers, and Cave Creek, constituted the Northern Periphery (Gumerman and Spoerl 1980). The extensive Central Arizona Water Control Study surveys of the late 1970s and early 1980s, sponsored by the Bureau of Reclamation and mandated by the NHPA, made it clear that the Northeastern Periphery had a rich and varied archaeological record, but without excavation data, only the barest outline of the area’s prehistory existed (Whittlesey et al. 1998). The prevailing view was that the area was marginal to major cultural developments of the Southwest, and its prehistory was interpreted in relation to surrounding areas, rather than on its own terms. Reclamation’s scope of work required that investigators build not only the basic chronological and cultural framework for organizing the area’s archae-

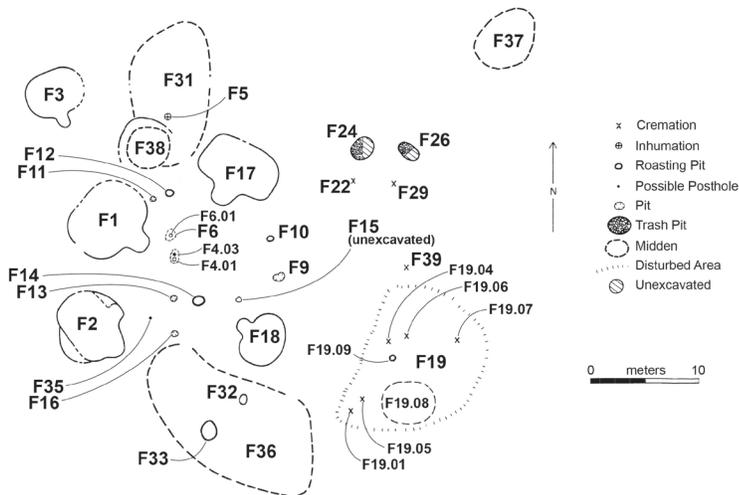


Figure 3. Pre-Classical period courtyard group at the CTC Site in the Lower Verde Valley (after Klucas et al. 1998:Figure 13.9).

Classic period. Nevertheless, the results of these studies provide compelling evidence that the pre-Classical period populations of the Lower Verde–Sycamore Creek areas were, for all intents and purposes, Hohokam.

These studies also suggest that the Hohokam did not settle in the peripheries because of their potential for irrigation agriculture. Rather, small-scale floodwater farming and exploitation of native wild plants, especially agave, and perhaps big-game hunting appear to have been the major attractions (Ciolek-Torrello 1998; Ciolek-Torrello and Klucas 2011). Significantly, traditional domesticates contributed much less to the diet in the uplands than in the core area (Adams 2003, 2011; Smith 2011). Although small-scale irrigation features have been identified, rock piles, most likely used in agave cultivation, were much more common (Ciolek-Torrello 1998; Homburg 1998; Van West and Altschul 1998). Following the core-periphery model, it is presumed that the people of the Sycamore Creek and Lower Verde areas exchanged these wild plant and animal foods for pottery and other Hohokam goods used in their ritual system. Agave—one of the staples of the Lower Verde area and the most likely resource that the residents of the area could have exchanged with the core area—was indeed abundant, if not ubiquitous in pre-Classical period sites in riverine areas of the Phoenix Basin such as El Caserío, La Lomita Pequeña (Gasser and Kwiatkowski 1991:Table 10.2), and the Grewe site (Miksicek 2001). The many hornos at the large Colonial period site of Los Hornos were also probably used for agave processing; agave remains, however, were not recognized in Hohokam flotation samples when the collection from this site was analyzed (Gasser and Kwiatkowski 1991:425). Nine of 10 hornos sampled at the Grewe site contained agave, suggesting that this was one of the primary foods prepared in these features

(Miksicek 2001:598). The ubiquity of agave in pre-Classical period Phoenix Basin sites, which exceed 80 percent at El Caserío and La Lomita Pequeña, are too high for what might be expected for a plant that was transported from distant upland areas. Tabular knives, the tools most closely associated with agave collection and processing, were also common at El Caserío ($n=16$) (Landis 1989:134) and La Lomita Pequeña ($n=38$) (Mitchell 1988:215). This evidence suggests local production and does not support exchange of this resource.

Ciolek-Torrello (1998, 2012) argues that it was not exchange that brought Hohokam pottery and other goods into the periphery. Rather, evidence for episodic occupation and abandonment in villages in both areas during the pre-Classical period suggests that it was the movement of people between these areas as periods of higher rainfall and flooding damaged irrigation

systems in the Phoenix Basin (Waters and Ravesloot 2001) but also expanded floodwater and dry-farming opportunities in the peripheries. Thus, the relationship between the lower Verde Valley and Phoenix Basin, during the pre-Classical period, appears to have been one of periodic population movement rather than exchange, movements that probably occurred when periods of higher rainfall caused floods that damaged the Phoenix Basin irrigations systems. During other times when drought reduced the capacity of upland floodwater farming systems, people in the peripheries probably moved back to the Phoenix Basin. This is not to argue that people abandoned the Phoenix Basin or even abandoned individual settlements in the Phoenix Basin at such times. Rather, people living on the margins of the



Figure 4. Hohokam Red-on-buff pottery, three-quarter grooved axes, steatite palettes, and censor from pre-Classical period sites in Sycamore Creek area (Klucas et al. 2003).

canal systems or in the most vulnerable portions of the canal systems, left the Phoenix Basin for the uplands. Conversely, during periods of drought, canal systems in the Phoenix Basin would have been more reliable, whereas upland areas dependent on direct rainfall or floodwater farming would have been less productive, and people living on the margins of these field systems would have returned to the Phoenix Basin. This is not to suggest that large permanent villages were not present in upland areas during the pre-Classic period. Azatlan, located along the Lower Verde River near the foot of the McDowell Mountains, is one of the largest known Hohokam villages and contained four ball courts (Ciolek-Torrello 1998). Smaller villages, but still substantial settlements, such as the Palo Verde Ruin in the New River area (Hackbarth and Craig 2007), and Scorpion Point Ruin and the Bartlett Flats Site along the Lower Verde River also contained ball courts (Ciolek-Torrello 1998). These villages may have been permanently settled by a core residential group, but individual households within these villages and many neighboring hamlets were probably relatively mobile. The ball courts undoubtedly facilitated exchange of resources and products between villages in upland areas and the major riverine valleys (Abbott et al. 2007; Abbott et al. 2008; Hackbarth and Craig 2007). Ball courts also probably served to create bonds between riverine and upland residents that facilitated movements of households and helped to integrate the immigrant households into their communities.

Research sponsored by Reclamation and the U.S. Army Corps of Engineers (Bruder 1983a, 1983b; Ciolek-Torrello 1982; Doyel and Elson 1985; Green 1989; Greenwald 1988; Henderson and Rodgers 1979; Rodgers 1974, 1977, 1987; Weaver 1974) provide some of the most important sources of data on the Northern Periphery and suggests strong similarities with the Lower Verde during the pre-Classic period.

Tonto Basin

Research in Tonto Basin has also benefited from passage of the NHPA with most of the work sponsored by Reclamation, ADOT, and the Tonto National Forest. This research suggests Tonto Basin exhibits a different pattern than the other peripheral areas during the pre-Classic period. On the one hand, many sites in Tonto Basin had high percentages of buff ware pottery, courtyard groupings, cremation burial, and other trappings of Hohokam culture. Some of these sites so closely resembled sites in the Phoenix Basin that Roosevelt 9:6, located in Tonto Basin, was used by Emil Haury (1932) as the site type for the Hohokam Colonial period.

On the other hand, considerable variation existed in ceramic assemblages and architectural characteristics within Tonto Basin. For example, the Ushkish Ruin (Haas 1971)—one of the earliest NHPA-mandated excavations in Tonto Basin—was characterized by both Hohokam-style houses-in-pits and Mogollon-style pit houses,

Hohokam Red-on-buff and Forestdale Red pottery, and cremation and inhumation burials. Gregory (1995) argued that the large houses and eastward orientation of most of the houses at this site reflects a Mogollon “big-house” organizational pattern rather than the courtyard arrangement commonly found in contemporaneous Hohokam settlements.

In a major ADOT-sponsored study, Elson et al. (1992) argued for an indigenous, local tradition to account for these differences, one which J. Scott Wood (personal communication, 1994) termed the “Central Arizona Tradition.” Subsequent discovery of an Early Ceramic (A.D. 1 to 600) period settlement at the Eagle Ridge site in Tonto Basin bolstered this hypothesis (Elson and Lindeman 1994). The eastward-oriented, bean-shaped houses at this site are typical of Early Mogollon Pit House period sites, which together with evidence from later sites suggest a strong Mogollon influence in this indigenous culture. Importantly, an Early Formative occupation has not yet been found in the Northern Periphery, although hints of it have been found in the Sycamore Creek area (Ciolek-Torrello et al. 2009) and the Verde Bridge site (Hackbarth 1992).

Although Hohokam colonists from the Phoenix Basin may have been present in Tonto Basin, there is little evidence for the kind of intensive interaction with the core area that is evident in the Northern Periphery and Lower Verde Valley (Abbott et al. 2008). Significantly, no ball courts have been identified in Tonto Basin, and a strong local plain and red ware pottery tradition is present using diabase temper from the Sierra Ancha (Simon et al. 1998) and granitic temper from the eastern slopes of the Mazatzal Mountains (Micas and Heidke 1995).

The Western Papagería

Turning to the Papagería, the relationship with the Hohokam also may have involved a mix of Hohokam and other cultural traditions, including Patayan (Figure 5). The Western Papagería has traditionally been viewed as an area that Hohokam and Patayan groups passed through to obtain obsidian from the Saucedo and Sand Tank Mountains and salt and shell from the Gulf of California as well as a secondary resource area for seasonal hunting and foraging (Ahlstrom 2000; Heilen and Vanderpot 2013; Slaughter et al. 2000). Masse (1991:201) proposed three models explaining use of the Papagería: a) as an area inhabited by an autochthonous group culturally affiliated with the Hohokam; b) an area used seasonally by the Hohokam for “summer field villages”; or c) an area inhabited by indigenous people who were independent of the Hohokam.

Since the passage of the NHPA, large-scale survey and a variety of data recovery projects have suggested a more-intensive use of the Western Papagería for farming and foraging than had been assumed and a more dynamic and varied use of the landscape (Ahlstrom 2000; Dooley 2006; Doolittle 2004; Hill and Bruder

2000; Homburg et al 1994; Huckell 1979; Masse 1980; Olszewski et al. 1996; Raab 1974; Sagebiel et al. 2008; Slaughter et al. 2000; Tagg et al. 2011) (see Figure 5). A number of investigators have suggested that the area was likely used by small, permanent indigenous populations who interacted with neighboring Patayan- and Hohokam-affiliated people, in addition to being used by seasonal Hohokam migrants from riverine settlements (e.g., Ahlstrom 2000; Slaughter et al. 2000). As in the case of Tonto Basin, no ball courts have been identified in the Western Papagería.

Hohokam pottery, however, is abundant in certain areas of the Papagería, particularly in the east. By contrast, Patayan pottery is found in greater frequency to the west, although Hohokam and Patayan pottery have overlapping distributions and are often found together at individual sites. Does this evidence suggest that the Hohokam-affiliated groups lived in, used, or traveled through the Western Papagería, or does it suggest interaction between indigenous groups and Hohokam-affiliated groups living outside of the Western Papagería (Heilen and Vanderpot 2013)? Ceramic compositional analysis suggests that much of the pottery used in the Western Papagería was transported over long distanc-

es from the lower Gila Valley and could have been obtained through exchange with the Hohokam or brought into the interior desert from riverine settlements by logistical parties (Beck and Neff 2007; see also Beck 2006; Beck et al. 2012; Abbott 2000b). In her analysis of sherds from the Mobak site and other sites nearby, Micas (2000) concluded that some Colorado Red and Colorado Beige vessels were locally made.

THE CLASSIC PERIOD

Desert Transition Zone

The spatial diversity in the occupation of the peripheries is matched by temporal diversity. Each area of the periphery experienced radically different settlement changes in the Classic period. Perhaps most striking was the almost complete abandonment of the lower reaches of the Agua Fria, New River, and Sycamore Creeks and the lower Verde Valley—areas that had been intensively settled by Hohokam, who had immigrated from the Phoenix Basin, in the Pre-Classic period (Figures 6 and 7). Where did these people go? Abbott (2000) has argued that the construction of several large irrigation systems and associated communities in the Mesa and

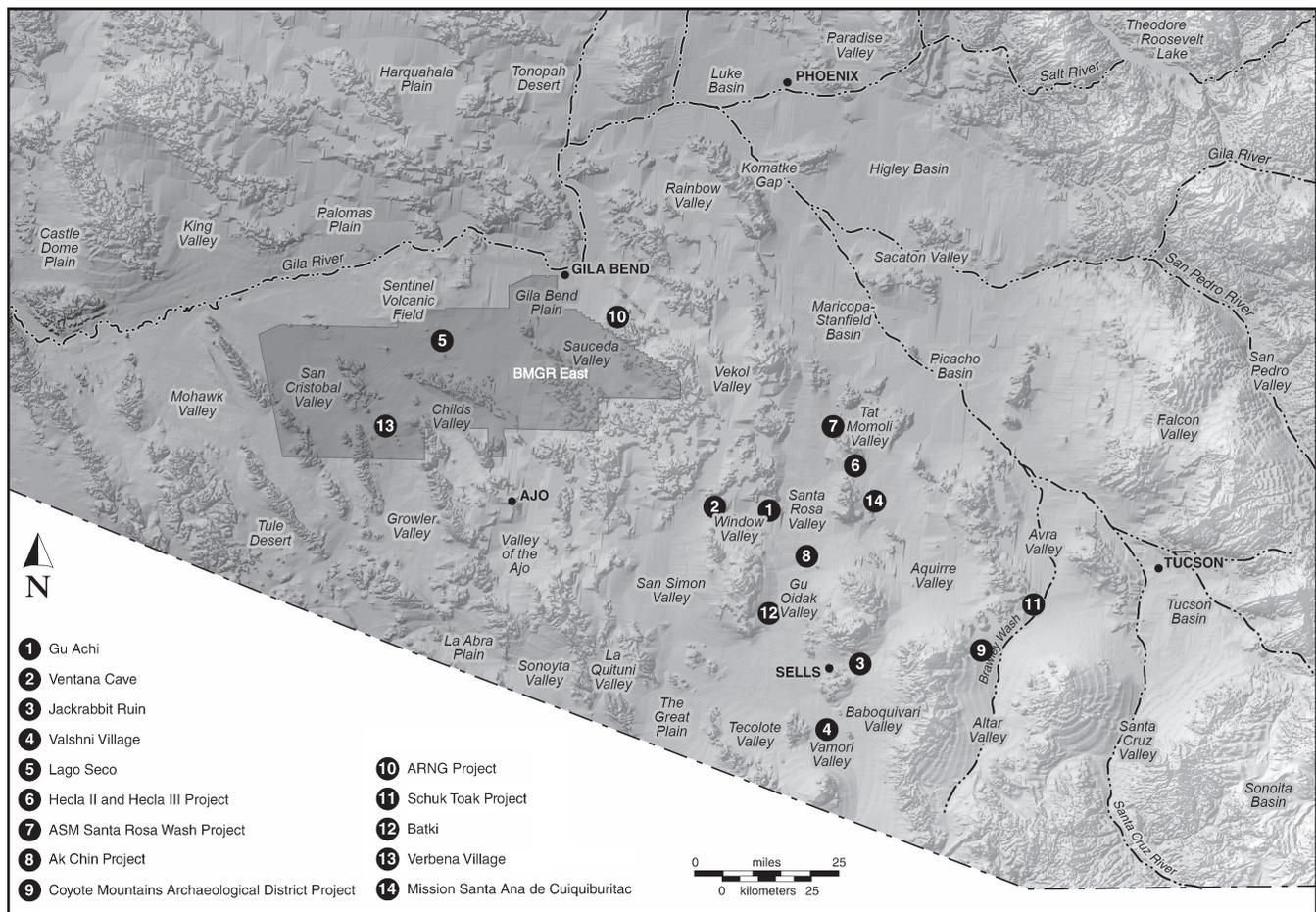


Figure 5. Major archaeological sites in the Papagería (adapted from Homburg 2006:Figure 17).

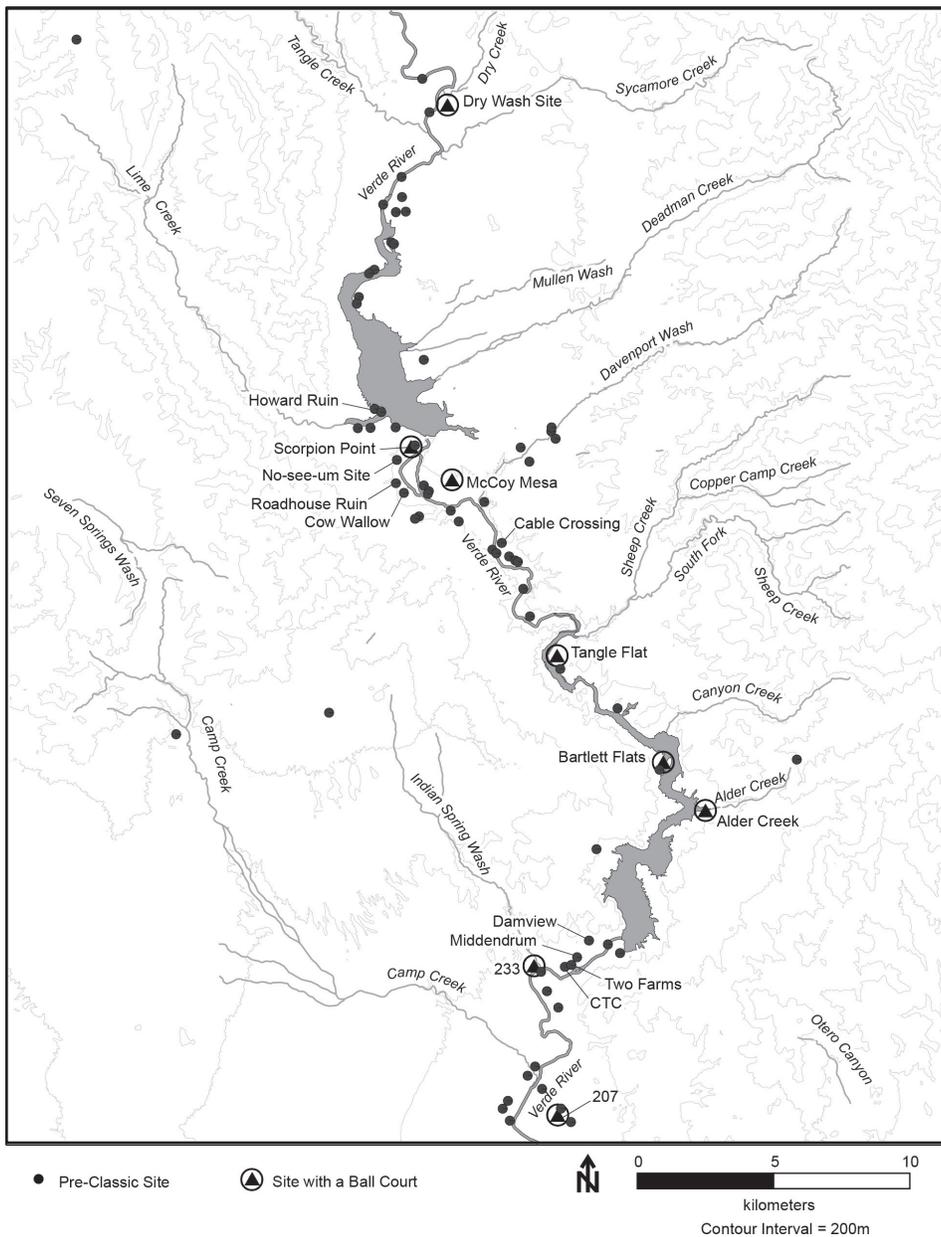


Figure 6. Pre-Classic period settlement in the Lower Verde Valley (after Ciolek-Torrello 1998:Figure 14.15).

Scottsdale areas of the Salt River Valley during the Classic period resulted from movement of Hohokam out of the Gila River area, whereas Ciolek-Torrello (1998, 2012) argued that Hohokam abandoned their many villages in the Lower Verde Valley and moved into this neighboring part of the Salt River Valley. Abbott et al. (2008) have also highlighted the ceramic exchanges between the Northern Periphery, west of the Lower Verde Valley, and irrigated villages on Canal System 2. It is likely that people followed these connections and immigrated to the western part of the Salt River Valley, when the Northern Periphery was abandoned.

As these peripheral areas were abandoned, new settlements were established in their upper reaches.

and numerous farmsteads and field houses were built. Large-scale dry-farming fields developed at this time were probably used to cultivate domesticated varieties of agave (Homburg 1998) (Figure 9).

The Northern Periphery and Lower Verde had once been intensively settled by the Hohokam, but the new settlements in these areas were now separated from the Phoenix Basin by a 20-km-wide band of uninhabited no-man's land, and a series of forts and sites in defensive locations were constructed all along their southern boundary from the Agua Fria River to Tonto Basin (Abbott et al. 2008; Ciolek-Torrello 1998; Doyel and Crary 1995; Wilcox et al. 2001a, 2001b). These settlement changes suggest a hostile relationship between

Domestic arrangements, mortuary patterns, and material culture were completely restructured and replaced in these new communities probably reflecting the replacement or assimilation of the remaining Hohokam population by an immigrant Sinaguan or another Western Pueblo group. The source of immigration is suggested by the appearance of Sinaguan-style pit rooms (Figure 8) and locally produced red ware pottery at the end of the Sedentary period (Ciolek-Torrello 1998). Although the development of irrigation agriculture expanded in the Horseshoe Basin portion of the Lower Verde Valley in the Classic period (Van West and Altschul 1998), platform mounds were absent, with one possible exception, AZ O:14:34/116 at the Agate Site Complex (Ciolek-Torrello 1998:575). Some have suggested that a platform mound was present at the Mercer Ruin (Crary 1991:17-18), although Mindelleff (1896) suggested these were two-story rooms when he observed the ruin prior to its inundation by Horseshoe Lake. Rice (1986:204) suggests platform mounds were present at the Agate Site and AZ O: 24:42 but not at Mercer. In the place of platform mounds, large pueblos

the Hohokam and other cultural groups now occupying these peripheral areas (Abbott and Lack 2013).

Tonto Basin

Tonto Basin followed a different path. Although naturally separated from the Phoenix Basin by the Mazatzal Mountains and connected only by the gorge of the Salt River, there is no evidence for large-scale abandonment and wholesale settlement restructuring. Instead, Classic period developments in Tonto Basin emulated many of those in the Phoenix Basin (Clark and Vint 2004; Elson et al. 1995; Elson et al. 1992; Hohmann 1985; Rice 1985, 1998), with numerous irrigation-based platform mound communities established throughout the area. Despite this similarity, settlement patterns and cultural manifestations were strongly influenced by Western Pueblo traditions as well (Ciolek-Torrello 1998; Ciolek-Torrello and Welch 1994). Hohokam pottery was replaced by white wares and locally made plain and red corrugated wares. Clark (2001) maintains compact room blocks, distinctive architectural styles, abundant White Mountain Red Ware pottery, and other unusual characteristics in some communities suggests the presence of actual Puebloan immigrants. Paradoxically, Classic period Tonto Basin communities eventually came to resemble their Phoenix Basin counterparts more so than communities in peripheral areas settled by the Hohokam in the pre-Classic period.

Western Papaguería

The Western Papaguería also experienced changes in the Classic period. Like the southern portions of the Northern Periphery and the Lower Verde, the Gila Bend area was depopulated (Doyel 2012:10). Areas of the Western Papaguería, however, experienced intensified use by the Hohokam. Increased numbers of thermal

features dating to the Classic period suggests intensified use of subsistence resources, particularly in alluvial settings where farming was possible. Many researchers had previously asserted that farming was virtually impossible in this region (e.g., Castetter and Bell 1942:62–63; Crosswhite 1981:51; Fontana 1983:131; Hackenberg 1983:161). Although evidence for agriculture is rare, and the foraging of succulents and seeds more common, agricultural activities took place in better-watered locations and investment in water control intensified during the late Sedentary and early Classic periods (Doyel and Rankin 2008; Homburg 2006; Pearthree et al. 2008). Numbers of projectile points also increased, suggesting

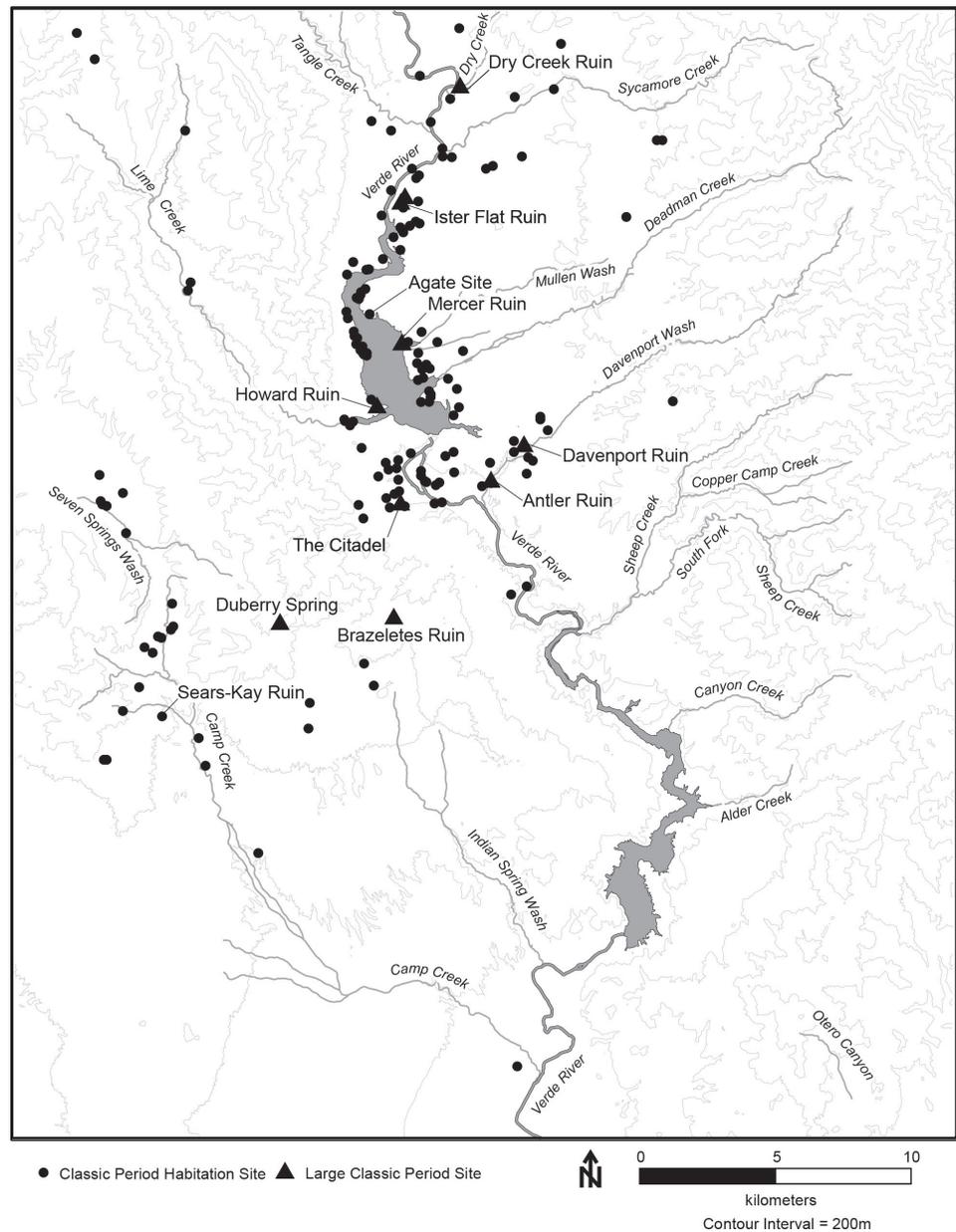


Figure 7. Classic period settlement in the Lower Verde Valley (after Ciolek-Torrello 1998:Figure 14.16).

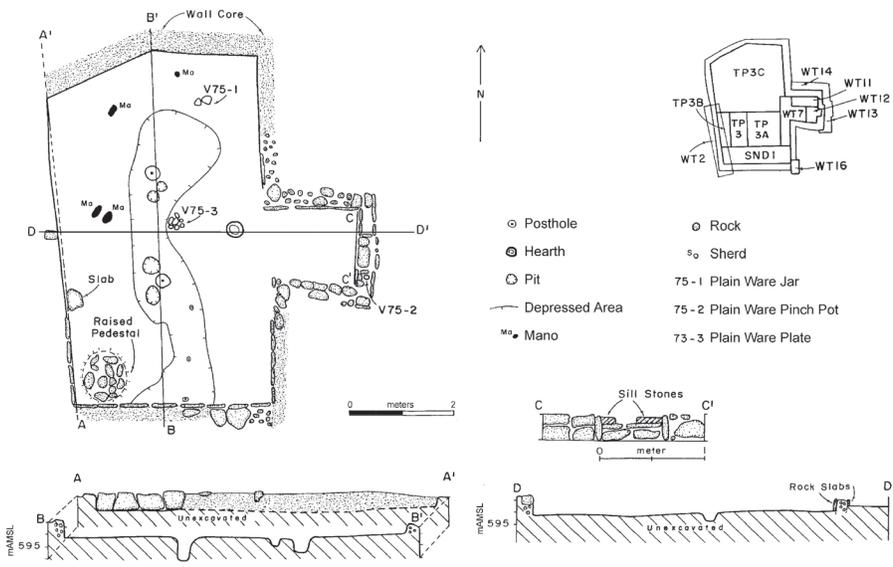


Figure 8. Plan and cross sections of Feature 5, a Late Sacaton phase, Sinaguan-style masonry-walled pit room, Lone Juniper Site, Lower Verde Valley (after Ciolek-Torrello et al. 1998:Figure 75.5).

increased hunting. Hohokam use of Saucedá obsidian from the Western Papaguería increased as the Superior source came under control of the Salado (Mitchell and Shackley 1995) and acquisition and working of Glycymeris shell by the Hohokam intensified. Routes used to obtain shell, however, changed as the Eastern Papaguería was cut off from the shell trade (Figure 10).

CONCLUSIONS

As part of SRI's Reclamation-sponsored research in the Verde Valley, Whittlesey (1998) sought to account for these divergent patterns. She substituted the core-periphery model with what she terms the joint-use-area model, the essence of which is that the peripheries were used by a variety of people, often co-residing in the same areas, and even the same sites. This model, however, tends to overemphasize the concept of co-residence—that different groups occupied the peripheries at the same time. Although this model may work well to explain the prehistory of Tonto Basin and, possibly, the Western Papaguería, it does not fit the pattern in the Northern Periphery and Lower Verde/Sycamore Creek areas, which were intensively settled by the Hohokam and exhibited little evidence for indigenous cul-

tural traditions or Mogollon influence in the pre-Classic period. In the Classic period, the Hohokam abandoned these areas, returning to the Phoenix Basin. Interaction between the Hohokam and the new residents in the Northern Periphery and Lower Verde Valley was limited by an uninhabited zone and a line of fortifications. By contrast, in Tonto Basin, Hohokam and indigenous, Mogollon-influenced populations commingled with new Western Pueblo immigrants to form the Salado culture in the Classic period, a culture that integrated characteristics of larger contemporaneous Phoenix Basin communities with Puebloan characteristics.

Both the core-periphery and joint-use-area models have validity in explaining aspects of the prehistory of southern Arizona but do not account for the tremendous diversity in use of these areas. We cannot continue to view the peripheries only through a Hohokam prism. Instead, we must see them as distinct, highly diverse natural and cultural landscapes representing frontier zones that separated the centers of the major prehistoric cultures of the Southwest. The prehistory of these frontiers was much more fluid and dynamic than previously thought, as cultural boundaries shifted and different cultural groups extended their influence over

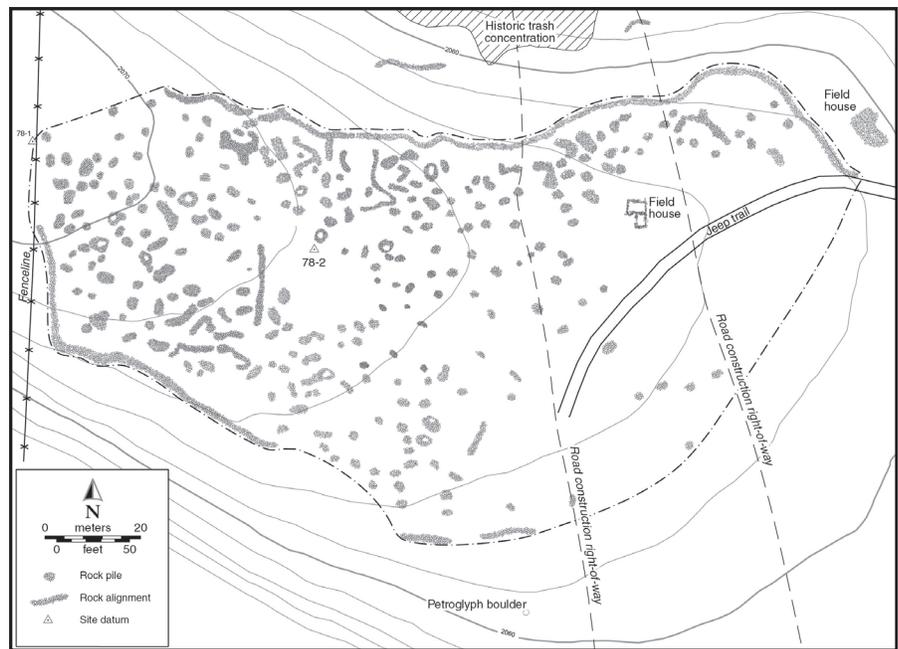


Figure 9. Agricultural rock piles and terraces at the Crash Landing Site, Lower Verde Valley (adapted from Homburg and Ciolek-Torrello 1998:Figure 78.78a).

these areas in different ways and to varying degrees. But if not for NHPA-mandated research, we would still be looking at these remote and rugged peripheral areas from the outside with little inside knowledge of what actually transpired.

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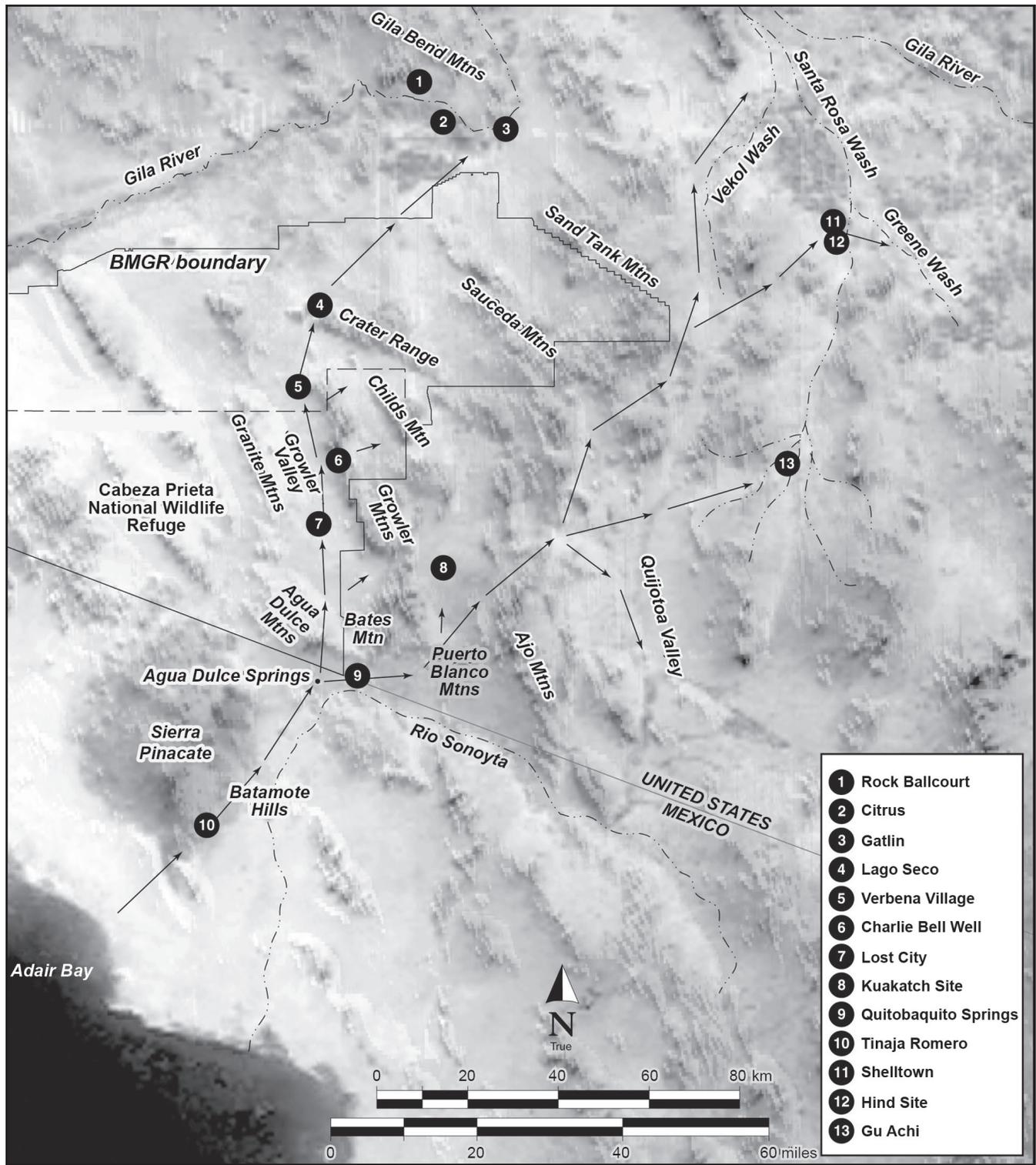


Figure 10. Possible pre-Classic period Hohokam shell-gathering routes (adapted from Hayden [1972:Figure 3], descriptions in Howard [1993], and Slaughter and Lascaux [2000:Figure 11.5])

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HISTORICAL ARCHAEOLOGICAL SITES IN ARIZONA: FIFTY YEARS OF THE NHPA AND NHPA-INSPIRED SITE RECORDING

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ABSTRACT

Passage of the National Historic Preservation Act fifty years ago, along with subsequent state and local laws, has had significant and lasting impacts on the recording of historical archaeological sites in Arizona. The federal law led to the eventual passage of similar state and local laws and ordinances aimed at historic preservation and gave rise to the cultural resource management industry. To explore the effect of these laws, we queried the AZSITE database and examined the spatial distribution and types of site activities within the state's urban and rural settings. A sample of 966 site records was divided into 15 site activity classes to assess their frequency and spatial distribution. The evidence suggests that some portions of the state lag other areas in the recording of sites, and particular types of site activities may not be reported in proportion to their historical occurrence within the state.

INTRODUCTION

The National Historic Preservation Act (NHPA) was signed into law 50 years ago with the stated goal of preserving our shared history as “a living part of our community life and development in order to give a sense of orientation to the American people” (Section 1 of the NHPA, Public Law No. 89-665, as amended by Public Law No. 96-515). The passage of the NHPA was a harbinger of similar state and local laws and ordinances over the following decades that were aimed at enhancing historic preservation. These laws contributed to the development of the modern cultural resources management industry. For this paper, we examine records and assess biases for one class of cultural resources, historical archaeological sites, in order to shed new light on how the federal NHPA and NHPA-inspired laws and ordinances (e.g., the Arizona State Historic Preservation Act of 1982, A.R.S §41-862 through 41-864, and Certified Local Governments) have affected our understanding of the historical period in Arizona. Our primary goal in this pa-

per is to examine the impact of historical archaeological site recordings that may have been stimulated by the NHPA and NHPA-inspired state and local laws.

“Historical period sites” in our study refers to archaeological sites defined by the original site recorders as having a historical period component, regardless of whether that site also had a prehistoric component or whether the historical occupation was the predominant component. We did not exclude historical structures, objects, and buildings if they were recorded as archaeological sites. Nor did we eliminate sites from the sample if subsurface excavations have not occurred at the property. As a result, some historical archaeological sites in this study have standing architecture, such as the county courthouses in Yavapai and Cochise counties, but unknown archaeological deposits. Likewise, the recorded sites include recently demolished structures that covered archaeological deposits, such as entire city blocks in Phoenix and Tucson. For purposes of this paper we do not restrict ourselves to sites recorded by projects that solely have the NHPA as the legal nexus for investigations. Instead, we view state and local ordinances as being inspired and inexorably linked to the NHPA. Therefore, this paper divides recorded archaeological sites into pre- and post-NHPA time periods regardless of whether a project recording sites complied with federal or other laws (i.e., state or municipal laws). To be clear, we assess the impact of historic preservation laws in general—and not just the NHPA—on the frequency of recorded historical period sites in the state.

METHODS

To identify historical period sites for this study, we queried AZSITE, the state's electronic database of site records. We posed several queries to AZSITE to assess the impact of the passage of historic preservation laws

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over the past 50 years and how they affected our understanding of historical archaeology in Arizona. AZSITE data was readily available both online and through requests made to the AZSITE staff for queries. AZSITE staff provided the information about urban sites and the online research was conducted for rural sites. The resulting two samples represent a geographically diverse sample universe. Information in AZSITE, however, has some limitations. The site records do not indicate whether the NHPA was directly involved with the original recording of the site or any subsequent rerecording and we did not conduct interviews with persons familiar with projects to confirm the funding source or purpose of investigations.

Also, the archaeological site data in AZSITE excludes land under the jurisdiction of Native American tribes. Tribal lands comprise approximately 37 percent of Arizona and include significant historical archaeological resources generally not listed in AZSITE (with some exceptions)¹. Furthermore, not all federal agencies provide site records to AZSITE, including: the Bureau of Land Management (BLM), Bureau of Reclamation, National Park Service (NPS), and Forest Service (FS). Some site records in AZSITE are from National Forest lands and were considered for inclusion in this paper. However, the FS site records we examined had to be excluded because they contained minimal information². Federal lands account for approximately 44 percent of Arizona, which includes large blocks of contiguous parcels (such as National Forests, National Parks, and military bases) as well as small parcels in a checkerboard pattern across the landscape managed by the BLM. Excluding these federal and tribal lands from the study does affect the total number of sites available for consideration, but their absence may be offset by the large numbers of recorded sites in our sample ($n = 966$). Finally, it is important to note that uploading site records to AZSITE has possible time delays of 3–5 years, and therefore, our sample may not include recently completed projects.

Even without the federal and reservation lands, our sample universe was extremely large, and we opted to pare down the geographic extent of our search and number of sites to a more manageable size. We reasoned that most development projects subject to federal NHPA or similar state and local laws and ordinances were located in urban areas, which likely resulted in a sizeable sample of historic sites being listed in AZSITE. Linear sites (especially roads and canals) were retained in the sample but were excluded from some analyses because of their potential to traverse both urban and rural settings and the potential that linear sites could have been reported at more than one location. Therefore, sites situated in modern urban settings should provide a representative sample of what has been recorded throughout the state as a result of the NHPA and passage of similar laws. In addition, modern urban centers often developed out of historical-period occupations,

and construction projects in urban centers were expected to bring historical archaeological sites to the attention of archaeologists. At the same time, we realized that certain types of sites (mines and ranches, among others) would be rarely recognized in modern urban settings. Therefore, we decided to compare a sample of sites in urban centers with a sample of sites from rural settings to assess differences between urban and rural locations in terms of site types and to highlight differences between the two sample areas.

For this reason, we split the state into two sample units (urban and rural), characterized the types of reported historical-period sites, mapped their locations, and evaluated biases in the data. These metadata suggest that the legislation has had a positive effect on the quantity and quality of information reported about historical archaeological sites. We use the observed patterns in the site data to suggest some possible interpretations of the collected data and directions for future research.

We began our analysis by defining the modern urban centers to be included in our study. We classified a modern urban center as any currently occupied city or town with a population of 10,000 or more in the 2010 federal census. This criterion led to the identification of 44 urban centers within Arizona covering a total of 113,998 square miles (72,958,720 acres). This large, aggregated area was reduced to include only historical-period sites reported within the known boundary of the original historic town or within an arbitrary polygon up to a 4-mile radius that surrounds the center of the modern urban center. This process reduced the search area in AZSITE to 1,081 square miles or 692,102 acres (Table 1). Shape files of the 44 polygons were provided to the AZSITE consortium with the request to provide a list of historical archaeological sites within these areas. A total of 602 historic sites was identified within the 44 modern urban centers.

A second sample of sites for this study was drawn from AZSITE using a systematic random sample of the rural portions of the state. AZSITE site records were searched using the keywords “Historic” under “Cultural Affiliation” and “Temporal Component.” Approximately 5,444 site records were reported from this online search. Of the 5,444 rural sites in AZSITE, a 6.7 percent sample ($n = 364$ sites) was selected to represent rural historical archaeological sites in Arizona. This sampling of AZSITE’s rural sites was accomplished by selecting every tenth site that appeared in the sequential list of 5,444 sites. Our online query for rural sites was not constrained by any geographical boundary, which resulted in the capture of some sites that previously had been included in the AZSITE query for modern urban centers. These duplicate sites were excluded from the rural sample, and a replacement site from the online AZSITE query was selected; the replacement site typically was the next site provided in the AZSITE’s sequential list of sites.

Because the sequential list of sites was organized by the USGS quad sheets, this systematic sample is representative of the entire state. However, our study uses only sites with ASM site numbers, and excludes sites with FS and Museum of Northern Arizona (MNA) site numbers. We believe this selection process does not adversely affect our study. Many of the FS and MNA site records had minimal information which would not have contributed to the study.

Our online sample universe of historical archaeological sites (excluding FS and MNA sites) was identified using a query of AZSITE's "Temporal Component" record, which indicates if the site has a component postdating A.D. 1450. However, a site was excluded from the study if AZSITE had no other information about the site than what was in the Temporal Component record. Historical archaeological sites that also had prehistoric components were assigned a site type/function based solely on the historical-period artifacts present, ignoring all aspects of the prehistoric component. This query of AZSITE captured sites that had Native American, Euroamerican, and Asian-American cultural affiliations. Thus, the study

examines a variety of cultural groups. Nevertheless, most sites in the sample are associated with nineteenth- and twentieth-century Euroamerican occupation.

A site's function was categorized using AZSITE's "Affiliation" and "Features" records. Sites with multiple features or affiliations were grouped into broad, inclusive classes (Table 2). For example, sites that were described as having an artifact scatter were classed together with trash dumps (sites with massive amounts of refuse) but were separated from possible habitation sites. Some overlap and ambiguity is inherent in this classification system. For instance, Tumamoc Hill was classified as a "Government" site because of the Desert Laboratory and its National Historic Landmark designation, although the original purpose of the Desert Laboratory at Tumamoc Hill would just as easily fit within the Agriculture/Ranch class.

In the following discussion, the numbers of sites in each comparative analysis may vary because the AZSITE site forms may have incomplete data. However, the large number of sites drawn for the rural and urban samples (n = 966) ensures an adequate sample for our discussion.

Table 1. Urban centers in Arizona with population over 10,000.

Name	County	Shape file	Acres ^a	Name	County	Shape file	Acres ^a
Apache Junction	Pinal	2-mile radius	8,038	Mesa	Maricopa	polygon	9,256
Avondale	Maricopa	polygon	8,038	Nogales	Santa Cruz	polygon	10,580
Bisbee	Cochise	2-mile radius ^b	17,455	Oro Valley	Pima	polygon	11,366
Buckeye	Maricopa	polygon	8,038	Paradise Valley	Maricopa	2-mile radius	8,042
Bullhead City	Mohave	2-mile radius	8,038	Payson	Gila	polygon	12,232
Camp Verde	Yavapai	3-mile radius	18,087	Peoria	Maricopa	2-mile radius	8,042
Casa Grande	Pinal	3-mile radius	18,087	Phoenix	Maricopa	polygon	41,513
Chandler	Maricopa	polygon	18,087	Pinal		3-mile radius	18,095
Chino Valley	Yavapai	2-mile radius	8,038	Prescott	Yavapai	3-mile radius	18,095
Coolidge	Pinal	2-mile radius	8,038	Prescott Valley	Yavapai	2-mile radius	8,042
Cottonwood	Yavapai	3-mile radius	18,087	Queen Creek	Maricopa	2-mile radius	8,042
Douglas	Cochise	2-mile radius ^b	5,800	Sahuarita	Pima	polygon	19,863
El Mirage	Maricopa	polygon	6,387	San Luis	Yuma	Polygon	4,020
Eloy	Pinal	2-mile radius	8,038	Scottsdale	Maricopa	2-mile radius	8,042
Flagstaff	Coconino	polygon	14,074	Sedona	Yavapai	polygon	12,805
Florence	Pinal	3-mile radius	18,087	Show Low	Navajo	3-mile radius	18,095
Fountain Hills	Maricopa	2-mile radius	8,038	Sierra Vista	Cochise	4-mile radius	32,169
Gilbert	Maricopa	3-mile radius	18,087	Somerton	Yuma	2-mile radius ^c	8,042
Glendale	Maricopa	3-mile radius	18,087	Surprise	Maricopa	2-mile radius	8,042
Goodyear	Maricopa	polygon	78,587	Tempe	Maricopa	polygon	7,996
Kingman	Mohave	polygon	10,379	Tucson	Pima	polygon	59,612
Lake Havasu City	Mohave	polygon	16,609	Yuma	Yuma	polygon	11,869
Marana	Pima	2-mile radius	8,038				

a Portion of modern urban areas searched in AZSITE for recorded historical archaeological sites.

b North of international border only.

c Center of study radius is at Highway 95 and North Somerton Avenue.

BIASES IN THE HISTORICAL SITE EVIDENCE

To appreciate the available records and interpret the archaeological data we must understand what information is available about cultural resources, how records were collected about sites, and what biases may exist in those data. Three important biases must be recognized as potentially affecting the timing and tempo involved with the recording of historical archaeological sites. First, the number of individual archaeologists that recorded sites at various times in the recent past—as well as archaeologists' interest (or lack thereof) in recording historical period sites—has changed over time. Widely accepted research interests and the low number of archaeologists in the state before 1966 certainly limited the number of historical archaeological sites recorded. Before federal, state, and local historic preservation laws were enacted, historical sites were often recorded because of their association with a well-known person or event (e.g., Father Kino's entradas or Spanish presidios, battlefields, etc.), while many other contemporaneous sites were overlooked or ignored. In addition, before 1966, historical sites were often recorded because archaeologists thought that the information obtained from them could enhance the application of the direct-historical approach to interpreting the prehistoric archaeological record (Lyman and O'Brien 2001). For example, Edward Bridge (Ned) Danson used

the direct-historical approach in 1937 when he recorded Guevavi Mission with the expectation that work in the vicinity of the mission would inform about the native culture during the Mission Period. Likewise, Haury (1975) remarked that in 1938 he started to excavate at a historic O'odham village (Batki), but permission was withdrawn and instead he worked at Ventana Cave. Batki was selected originally because it was visited in 1698 by Kino and was attacked by Apache in 1850 and thereafter abandoned. Haury's intent was to "work from the known to the unknown, i.e., from sites known to be Papago, pushing the occupation back with the hope of establishing a connection with the latest evidences as seen in the Sells Phase ruins." Haury (1975:18–21)

A second source of bias concerns a debate among archaeologists involved with cultural resource management (CRM) in response to rules promulgated for the implementation of federal and state legislation. The development of CRM as an industry was concomitant with change to the definition of what types of sites should be recorded. Questions debated and quantified by both archaeologists and government bureaucrats alike included: "What is an archaeological site?" "Are historical archaeological sites worthy of recording?" and "What is significance?" (e.g., Glassow 1977; King et al. 1977; McGimsey and Davis 1977; South 1979). The answers to these questions were influenced by the legal nexus required to establish internally consistent, logical, and systematic methods for treating resources. More inclu-

Table 2. Historical archaeological site classification.

Site activity class	Characteristics in AZSITE
Unknown/Prehistoric	Little information about historical archaeological component; possibly a brief mention of historical-period artifacts.
Artifact Scatter/Dump	Small or large scatter; any collection of refuse but lacking features.
Habitation/Foundation	Comment about a standing structure or remains of building foundation.
Subdivision/Multiple houses/Motel/Town-site	Comment about multiple structures or motel/hotel/boarding house, or tract homes.
Cemetery/Burial	Evidence from memorial marker or oral tradition.
Government/School/Sidewalk	Any public edifice or association with government office, courthouse, or property.
Artifact plus feature(s)	At least one feature in addition to surface artifacts.
Water-related (canals, rock features, water control)	Features related to use, transportation or storage of water, but not if a part of a larger farm, ranch, or homestead.
Communication/Park (Rock art, Theater, Rodeo Grounds)	Entertainment venues, epigraphy, linear telephone/telegraph poles.
Military	Fort, camp, bivouac or anything related to U. S. Army or other branches.
Agriculture/Ranch	Animal husbandry or any plant/animal resource site; may include habitations.
Industrial (Brickyard, Transmission line)	Any business or commercial activity.
Mine	Test pits or any excavations associated with resource extraction, plus milling facilities.
Church/Mission	Religious facility, shrine or any site related to personal or group beliefs.
Transportation	Linear site related to movement of people or resources.
Combination, any of the above	Sites with multiple types of features or if the site record includes a comment by the recording archaeologist that indicates multiple activities.

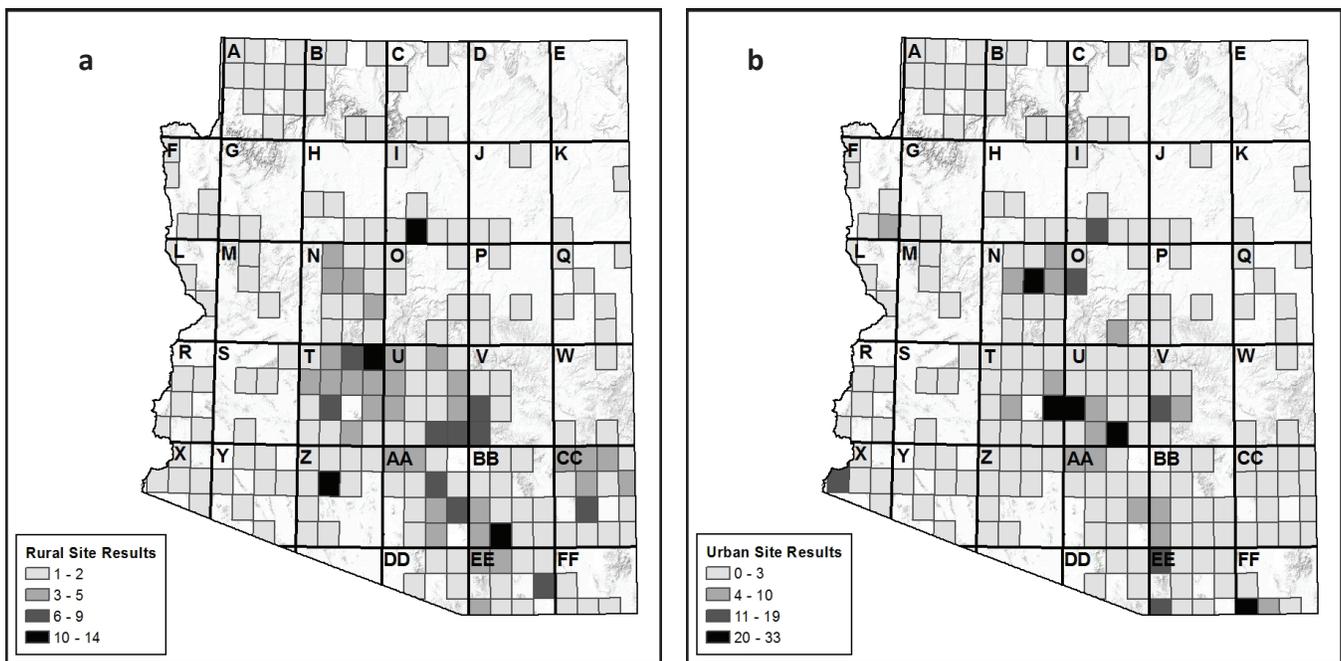


Figure 1. The distribution of rural (a) and urban (b) sites selected for inclusion in the study.

sive standards were developed over time and contributed to increased recording of historical archaeological sites. For example, Arizona State Museum's site-recording standards were originally defined on July 1, 1987, and were updated in 1993 (Arizona State Museum n.d.). These guidelines are still evolving (as evidenced by the Arizona State Historic Preservation Office's current effort to treat historical linear resources in a clear and consistent manner).

The third bias is the question of time, specifically the yearly advancing target of what sites are considered to be "historical." The NHPA and state and local laws define what is considered historical as sites more than 50 years old. Since 1966, the number of potential sites in Arizona that have reached 50 years of age has inexorably increased. The early and middle twentieth century was a time of rapid growth in Arizona, resulting in a concomitant increase in the number of potential historical archaeological sites. In other words, the number of archaeological sites recognized as "historical" since the NHPA was passed (i.e., dating to 1916 or earlier) is dwarfed by the number of archaeological sites recognized as "historical" in the decades since the passage of the NHPA (1966 or earlier, as of this writing).

All of these biases have created a positive feedback loop that has resulted in a continuous and ongoing increase in the number of recorded sites. However, our objective in this article is not to assess which one of these factors best accounts for the biggest uptick in the number of recorded sites; rather, our goal is to document the pattern of increased recorded historical sites resulting from the passage and continuing evolution of the NHPA and state and local laws.

SAMPLE EVALUATION

Our first task was to evaluate the distribution of sites and evaluate geographical biases in the data. The sample of rural sites was taken from the approximately 370 topographic quadrangle sheets that include some land outside of Native American reservations. Our sample of sites included at least one site from 216 quadrangle sheets, or 58 percent of the topographic quadrangle sheets. The study area's sample of rural sites from the 216 quadrangle sheets appears to have a random geographical distribution, even though it has less than 68 percent of all quads in the state, excluding quads largely within Native American reservations (Figure 1a). In contrast, sites in the modern urban areas are concentrated in the central portion of the state (Figure 1b). Our sample of sites within modern urban centers is not proportionate to the geographical size of the towns or their current population size. For example, the number of historical archaeological sites reported in and near Prescott (quad AZ N:7) is much higher than in the area around Tucson (quad AZ BB:13), even though Tucson is a substantially larger metropolitan area and has a longer history of occupation. Many of the sites in the urban center of Prescott are related to the Territorial period (1863–1912) and may include standing architecture.

IMPACT OF THE NHPA

To assess the impact of the NHPA we compared the recording dates of all 966 rural and urban sites in the sample. We combined the rural and urban sites and organized the data into 10-year increments using AZSITE's "Initial Date of Recording" field (Figure 2). These data

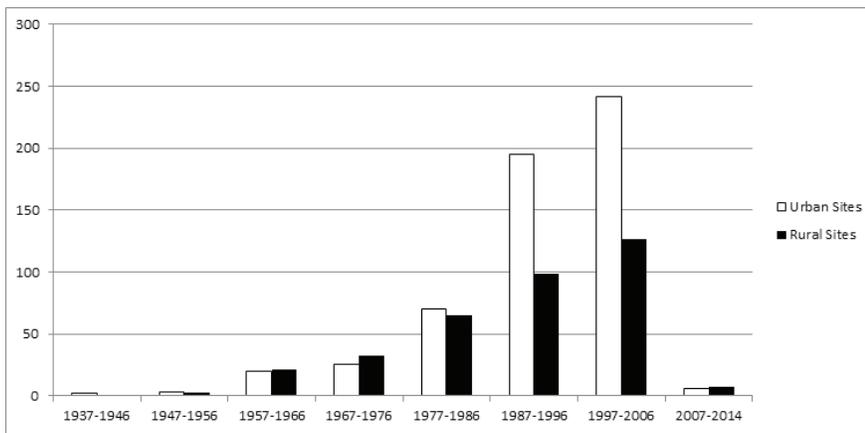


Figure 2. Numbers of historical archaeological sites recorded by decade.

were further grouped into the years before and after passage of the NHPA (Table 3).

The earliest recording of historical archaeological sites in our urban sample areas were reported from Tucson in 1939 and 1943, which were recorded because of their association with prehistoric components of AZ BB:13:9(ASM), the Tucson Presidio, and at AZ BB:13:6(ASM), the San Agustín Mission/Clearwater Site. Likewise, the first historical archaeological site recorded from our sample of rural sites was recorded in 1941 and consisted of one possible historical-period grave associated within a large prehistoric site (AZ Q:1:57[ASM]). These three sites from our sample suggest that, before the passage and implementation of the NHPA and similar state and local laws and ordinances, most historical archaeological sites were recorded because they were associated with prehistoric components or had Native American affiliations. Note that other sites recorded before 1941 may be listed in AZSITE but were not included in our combined 6.7 percent sample. For example, a check of well-known Spanish mission sites indicated that Guevavi Mission/AZ EE:9:1(ASM)³ (first recorded in 1937), Tumacacori/AZ DD:8:3(ASM)⁴ (first recorded in 1940), and Tubac/AZ DD:8:33(ASM)⁵ (first recorded in 1941) were recorded before passage of the NHPA, probably because of their association with Spanish colonialism and the sites figured prominently in written records (see Majewski and Ayres [1997] for a comprehensive history of investigations at Spanish Colonial sites). In the case of Guevavi, we have evidence that the archaeologist’s interest in the direct-historical approach was instrumental in its recording. Ned Danson, the first archaeologist to record Guevavi Mission, described his in-

tent as, “It was our hope to get some light on the culture of the Indians in the vicinity of the Mission Period, but to get this information will take considerable study of the immediate area” (AZ EE:9:1[ASM] site records in AZSITE’s Remarks tab).

A gradual increase in the number of recorded historical archaeological sites is evident in the first two decades preceding passage of the NHPA (see Figure 2). The number of archaeologists trained at Arizona universities increased after World War II, which may explain the greater number of historical sites record-

ed from 1957 to 1966, even though most were probably recorded as adjuncts to prehistoric sites (Ayres 1991)⁶. The University of Arizona’s Point of Pines field school from 1946 to 1960, plus development of an anthropology department at Arizona State University in the mid-1960s, increased the cadre of trained archaeologists in the state (Haury 1989). The names of archaeologists that completed site forms for historical resources from 1946 to 1960 in our sample reads like a Who’s Who of Arizona’s archaeologists: Breternitz, Colton, Dobyns, Hammock, Haury, and Wasley, among others. Although these individuals may have recorded the historical archaeological components as intrusions to prehistoric sites or as an afterthought, they at least recognized and documented them. The influence of these individuals may be understated because a large number of site records completed before 1966 do not identify the names of the recorders.

Passage of the NHPA in late 1966 did not have an immediate effect on the number of recorded sites, but the legislation did have an observable effect a couple of years after state and local regulations were promulgated and widely implemented. Prior to 1966, the numbers of sites recorded in urban and rural settings was nearly equal (see Figure 2). Following passage of the NHPA, however, an observable increase in the number of recorded historical archaeological sites continued for two decades. The increase is almost equally distributed between urban and rural settings. After 1986, however, the number of sites recorded in urban areas increased at a faster rate than in rural areas. The possible causes of this disparity are awareness on the part of archaeologists and population growth in urban areas (Arizona’s censuses after 1950 show an almost 40 percent increase for each decade [Forstall 1995; U.S. Census Bureau 2015]) and the corresponding infrastructure development (e.g., highways, Central Arizona Project, downtown and urban renewal, and other large projects), which likely increased the rate at which sites were reported within urban areas.

Table 3. Recorded historical archaeological sites.

	Sites in Urban Centers	Sites in Rural setting	Total
Before 1966	25	25	50
After 1966	539	331	870
Total	564	356	920

A large percentage of this exponential increase in recorded sites around 1986 is attributable to large-scale archaeological projects in the Tucson vicinity, where 66 percent of urban sites in our sample were recorded after 1986. Two waves of site recording efforts within Tucson are evident in 1979 and 1997. A sizeable proportion of the 1979 recording effort documented 15 sites as part of the Santa Cruz River Park Survey project (Betancourt n.d.). Houses, a dam, and homesteads were among the recorded site types. The second wave of recordings in 1997 was part of a project that reported 26 sites as part of historic barrios near downtown Tucson. Twenty-three of the 26 reported sites encompassed multiple city blocks within Tucson that varied between 0.6 and 20.4 acres in extent (Levi 1997). Updates to these site records occurred in 2012 for a plan of testing and monitoring in sensitive portions of Tucson (Lindeman et al. 2012). In contrast, our sample of rural sites does not have spatial clusters of recorded historical archaeological sites. However, our sampling strategy for rural sites may have obscured groups of sites recorded at the same time because we selected every tenth site, and sequential site numbers that may have been assigned to large projects would have been missed.

In summary, passage and implementation of the NHPA and NHPA-inspired state and local laws or ordinances appears to have resulted in an increase in the number of historical archaeological sites being recorded throughout Arizona, especially in the modern urban centers. By 2006, site recording in the 44 urban areas outpaced the rural areas by almost 2 to 1. This likely reflects the greater investment in development of infrastructure in urban centers as the population of Arizona increased.

SITE TYPE COMPARISONS

To further assess the impact of the NHPA we examined the types of recorded sites. As noted above, prominent sites mentioned in historical documents (e.g., Spanish Colonial presidios and missions, military forts, government centers, successful mines or ranches associated with locally important families) were frequently recorded before the NHPA was enacted. To assess this preference for the types of sites recorded, we compared historical archaeological site locations and sites types that were recorded before and after 1966.

Before 1966, 21 sites were recorded in urban settings, and 25 sites were recorded in rural areas (Table 4). However, there is some overlap in this comparison between the rural and urban study areas because two of the three roads classified as Transportation sites were part of our samples from both the urban or rural study areas. Sites recorded before 1966 are divided among eight categories of historical-period site types in urban settings, compared to nine categories in rural settings. Although the number of site type categories from both

rural and urban settings are nearly the same, the site type classes reported from the urban and rural areas is substantially different (see Table 4). The most frequent site types recorded before 1966 were Military and Government sites in urban settings (almost 48 percent of the urban total) but Agriculture/Ranch, Military, Habitation/Foundation, Artifact Scatters/Dumps, and Transportation in rural settings (80 percent of the rural total). Not surprisingly, the urban centers had more government facilities than rural areas, whereas Agriculture/Ranch sites were more common in rural areas.

After 1966, the influence of the historic preservation laws is likely the reason for the increase in the total number of recorded sites as well as the diversity of recorded site categories. On average, one historical-period site per year was recorded before 1966 in both urban and rural settings. In the 46 years after passage of the NHPA, the average number recorded per year increases to almost 12 per year for both the urban and rural settings. This comparison of averages is misleading because the number of recorded sites is much higher in the most recent decades than the first years after passage of the NHPA.

The influence of the NHPA appears to be particularly evident from the proportions of recorded site types in all of Arizona (Figure 3). Before 1966, the proportion of the ten site classes is heavily weighted towards recording of Agriculture/Ranch, Cemetery/Burial, Military, and Communication sites. A second tier of commonly recorded sites were related to Government, Water related, and Transportation sites. Three site categories were less frequently recorded before 1966: Artifact Scatter/Dumps, Artifact plus features, and Habitation/Foundations. Following passage of the NHPA, however, the greatest increase (in terms of proportionate and absolute numbers) in recorded site types occurred in the Artifact Scatters/Dumps category, which experienced a nearly three-fold increase in the numbers of recorded sites. We believe the NHPA, NHPA-inspired laws at the state and local level, and site-recording standard promulgated by the Secretary of Interior and ASM all contributed to a greater awareness among archaeologists of the need to record all sites, regardless of the site's composition and size. In particular, the Artifact Scatter/Dumps class previously may not have been recorded frequently because of a perception among archaeologists that their potential research value was low due to their small nondescript appearance and relatively invisible remains. The more recent appreciation among archaeologists concerning the information potential of these sites is best evidenced by the Arizona State Historic Preservation Office's development of a formal historic context focused on sites with historical period trash dumps (Sullivan and Griffith 2005).

RURAL/URBAN COMPARISONS

The next question we wanted to address was whether comparable types of sites were recorded in urban centers and the rural portions of the state. Arizona’s diverse physiographic zones make it unlikely that all types of historic sites would be uniformly distributed throughout the state, and our broadly defined site types may have obscured some distinctions among sites. For the initial comparison we selected a class of sites (Mining) that should not be uniformly distributed; we anticipated

that mountainous areas with mineral exposures would have the most reported Mining sites. As expected, the locations of Mining sites does correspond to mountainous terrain (Figure 4). However, our sample of recorded Mining sites does not include any sites within several portions of the state with multiple mining districts, most notably in the mountainous areas of west-central Arizona (USGS quads F, L, and M), and southwest of Prescott (USGS quad N) (see Figure 4). This dearth of Mining sites in USGS Quads F, L, M, and N may point to a weakness in our systematic random sample of AZSITE site records, al-

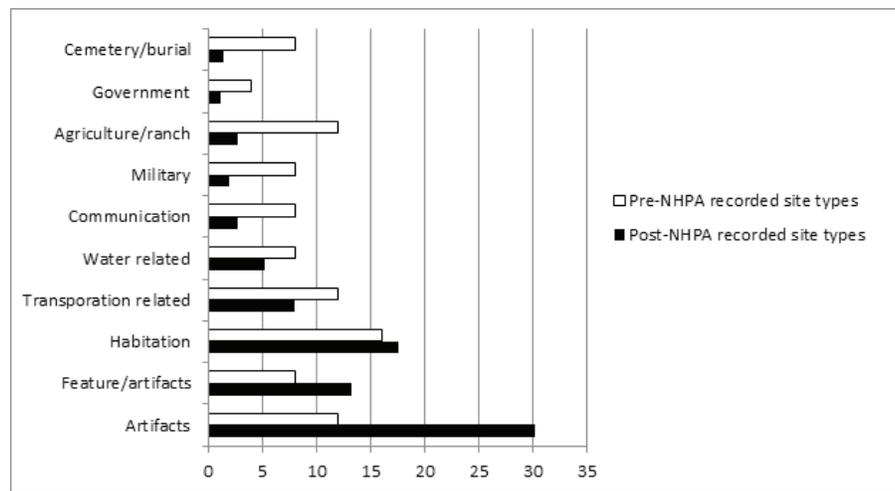


Figure 3. Proportion of site types recorded before/after NHPA was enacted.

though it could instead be related to the large amount of BLM land in the area or indicate few development projects occurring near Kingman and Prescott. The Mining sites in our sample of urban and rural settings amounts to 4.6 percent of all sites, which may indicate that the Mining sites are not very common in AZSITE overall. Given how key mining activity was to Arizona’s development, we would expect a larger number of recorded sites. Mining sites could include anything from small test pits that were used to sample ore quality across the landscape or large production mine complexes with multiple feature systems that include craft production facilities for timbering and blacksmithing, sorting or smelting and processing of ores, residential, commercial, and transportation components (Hardesty 1988). For example, small scale mining near Phoenix resulted in a minimum of 120 mining claims within the South Mountain Park, an area that produced only 7,000 ounces of gold over the course of 60 years (Bostwick 2001). Mineral districts with more productive mines would be expected to have even more Mining sites, suggesting the potential for tens of thousands of historic mining sites in the state. However, the few Mining sites in our sample from AZSITE may indicate under-reporting of this class of sites.

Two site categories with a robust presence in this study (Habitation/Foundation and Artifact Scatter/Dump) were examined to assess their distributions within Arizona (Figure 5). The numerous

Table 4. Categories of historical archaeological sites recorded.

Site activity class	Sites in urban settings			Sites in rural setting		
	Recorded before 1966	Recorded after 1966	Total	Recorded before 1966	Recorded after 1966	Total
Artifact Scatters/Dump	2	91	93	4	27	31
Subdivision/Multiple houses/Motel	1	52	53	–	6	6
Water management	–	35	35	–	23	23
Habitation/Foundation	2	27	29	4	20	24
Artifact plus feature(s)	–	28	28	–	17	17
Transportation	3	23	26	4	55	59
Combination	–	23	23	–	12	12
Government	5	16	21	1	3	4
Agriculture/Ranch	–	16	16	4	–	4
Industrial	–	14	14	1	4	5
Military	5	5	10	4	2	6
Church/Mission	2	5	7	–	2	2
Cemetery/Burial	–	6	6	2	1	3
Communication/Park	1	3	4	1	4	5
Mine	–	4	4	–	23	23
Total	21	348	369	25	199	224

sites in these two classes were expected to have wide geographic dispersions. The Artifact Scatter/Dump category is the most commonly reported site category and represents almost 21 percent of all recorded rural and urban sites in our sample (see Table 4). As configured in the current analysis, sites that are classified as Artifact Scatter/Dump range in size and complexity from small single episodes of trash disposal to large dumps. The Artifact Scatter/Dump class of sites has increased dramatically compared to any other class of sites that have been recorded after passage of the NHPA (see Figure 3). This increase could be related to updates in the ASM site recording standards issued in 1987 and revised in 1993. Figure 5 indicates these site types are widely reported throughout Arizona, and our sample may be a good representation of class dispersion in the state. Significantly, the frequency of Artifact Scatter/Dumps in the vicinity of Prescott (USGS quads N in Figure 5b) is moderately high and indicates that nonmining-related historical archaeological sites in the area are reported frequently, contrary to the few Mining sites reported in the same area.

The Habitation/Foundation category comprises 8.9 percent of all recorded urban and rural sites, the fifth largest category. The Habitation/Foundation site category has a pronounced spatial bias, with the majority of sites having been recorded in the southern half of the state (see Figure 5a). A minimal difference in the number of Habitation/Foundation sites is reported in urban settings (n = 29; 4.9 percent of all sites) compared to rural settings (n = 24; 4.0 percent of all sites); this difference is most noticeable from the higher number of historical archaeological sites reported near Prescott, Tucson,

Phoenix, and Globe (see Figure 5). This slightly higher number of recorded Habitation/Foundation sites near modern urban centers may reflect the higher frequency of historical-period sites in these centers compared to rural settings and the higher frequency of modern development projects in urban centers that have encountered more Habitation/Foundation sites.

The Artifact Scatter/Dumps category of sites are more common than Habitation/Foundation and Mine sites in the northern and western portions of the state, especially in USGS quads A, H, L, M, O, P, and R (compare Figures 4a, 5a, and 5b). Even today, these locations are among the more remote locations of the state with a low population (e.g., the Arizona Strip, Cerbat Mountains, vicinities of Kingman to Topock, the Big Sandy River near Wikieup, and much of La Paz County). The fact that these locations encompass few recorded historical archaeological sites of any type—and typically only small trash deposits—may suggest few opportunities for archaeologists to encounter sites. The dearth of historical sites also possibly reflects historical uses that were concentrated in a few areas. For example, significant historical mining activity occurred in the Cerbat and Black Mountain ranges near the towns of Oatman and Chloride (Lacy 1991), the Signal and McCracken mines near the Big Sandy River (Hill 1912), and the Mineral Park Mining District near Kingman (Dreyfus 1972). The number of archaeological projects in these areas, however, is significantly lower than other parts of the state, possibly reflecting the absence of site records listed in AZSITE and the large amount of BLM lands near the historic mines that might not have BLM resources reported in AZSITE.

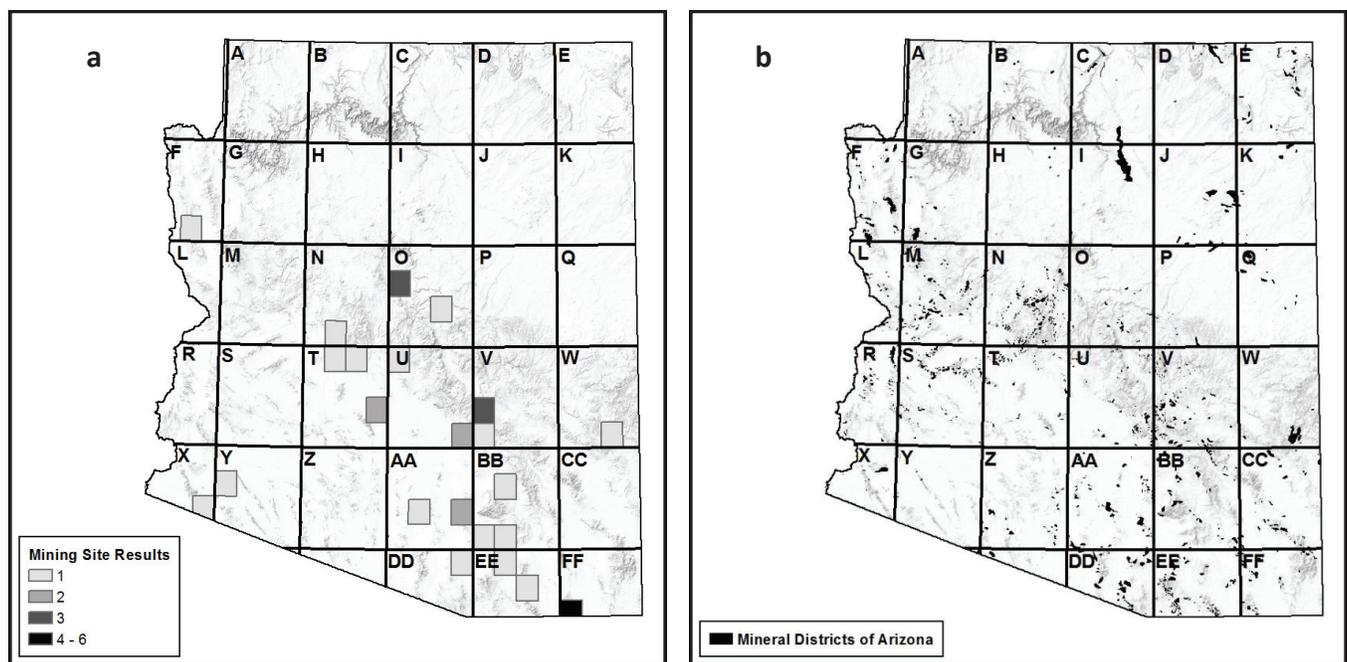


Figure 4. Distribution of recorded historical archaeological sites related to Mines (a) compared to known historic mineral districts in Arizona (b).



Figure 5. Distribution of recorded historical archaeological sites related to Habitation (a) and Artifact Scatters/Dumps (b).

CONCLUSIONS

We suggest that the passage of NHPA and subsequent NHPA-inspired state and local laws and ordinances has been responsible for a substantial increase in the number of historical archaeological sites reported in Arizona. The site file records examined for this study have demonstrated an increase in the overall numbers and types of historical archaeological sites that have been recorded since 1966. Nevertheless, the spatial distribution of sites listed in AZSITE indicates that some parts of the state may have data gaps and site functions may not be equally recorded throughout the state. These gaps could indicate that our study suffers from sampling error, but the 6.7 percent sample of recorded sites in AZSITE from rural portions of the state ($n = 364$) is adequate for a pilot study to characterize broad diachronic trends in the state. Whether AZSITE is representative of the entire state remains an open question until the size of the sample universe is better understood, a question that extends beyond the scope of this paper. Future AZSITE-based investigations of historical archaeological sites and their spatial distribution across Arizona could apply the same site classes and locations we have highlighted in this paper to more fully examine the preliminary trends we noted. The inclusion of sites on federal and tribal lands would greatly strengthen any future effort to explore the distribution of historical archaeological sites in the state. A larger sample of sites could also include information about the type of projects that recorded sites to more fully understand the impact of the NHPA compared to other laws.

Before the NHPA, sites that figured prominently in written records, particularly Spanish colonial sites, were among the first historical archaeological sites to be recorded in the 1930s and 1940s. More prosaic sites were often ignored by archaeologists until after passage of the act. The legislation compelled archaeologists to think more broadly about what defines an archaeological site, resulting in recording a wider range of historic site types.

The number of historical archaeological sites recorded from 1966 through 1987 gradually increased following passage of the NHPA and NHPA-inspired state and local laws and ordinances; in the late 1980s, a dramatic upturn in the number of recorded sites is evident. This upturn in recorded sites probably was related to a faster pace of modern development projects in Arizona, and possibly a greater awareness among land managers and federal, state, and local agencies of the need for consultation under Section 106 and other historic preservation laws. Overall, the NHPA and similar laws resulted in a wide variety of site types being recorded, but some potential data gaps were noted in this paper. Areas with historical-period mineral-mining districts have a low number of recorded mining sites and habitation sites compared to other portions of the state. These biases in the site records suggest that we have more to learn about Arizona's history from a study of the archaeological record dating to the historical period. These insights into the timing and tempo of Arizona's historical archaeology come on the 50th anniversary of passage of the NHPA, which recognizes that the country's spirit and direction of the nation are founded upon and reflected in its historic heritage.

Notes

1 Some archaeological sites on tribal land are listed in AZSITE, an obvious example being Snaketown (AZ U:13:1[ASM]). This is a rare exception, however.

2 A cursory inspection of some of the approximately 560 site records listed in AZSITE from the Kaibab National Forest indicates limited information is available about the sites, including site number, the date entered in AZSITE, a broad age and cultural affiliation, and occasionally a list of features; however, little descriptive information is available.

3 Guevavi was recorded by Ned Danson on October 8, 1937.

4 Tumacacori was recorded by the NPS archaeologist Louis R. Caywood, an early proponent of historical archaeology.

5 Tubac was recorded by Ned Danson and Louis R. Caywood in 1941 as part of a survey along the Santa Cruz River (Danson 1941).

6 Archaeologists passing through the University of Arizona's Department of Anthropology from 1957 to 1966 were trained as Americanist archaeologists (read prehistorians). Whether they recorded historical archaeological resources as intrusions into prehistoric sites or because of an interest in the direct-historical approach is immaterial, but the increase in the number of recorded historical sites in AZSITE over this time period is notable nonetheless.

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COMPREHENDING HOPI FOOTPRINTS: HOPI HISTORY AND TRADITIONS AT GLEN CANYON NATIONAL RECREATION AREA AND RAINBOW BRIDGE NATIONAL MONUMENT

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ABSTRACT

Section 110 of the National Historic Preservation Act requires federal agencies to identify, evaluate, and protect historic properties that fall under their jurisdictions. The Hopi Tribe has recently engaged in a collaborative research project at Glen Canyon National Recreation Area and Rainbow Bridge National Monument to identify historic properties significant to their tribe as part of the National Park Service's Section 110 compliance efforts. Understanding the values that tribal members ascribe to historic properties is essential for the National Park Service to appropriately protect and manage these places. The Hopi Tribe has broadly benefited from the NHPA because it has allowed them to engage with federal agencies and reconnect with their traditional cultural sites that exist well beyond the boundaries of their reservation.

INTRODUCTION

For more than 20 years, the Hopi Cultural Preservation Office has been engaged in a long-term, wide-scale program to use the research mandated by the National Historic Preservation Act (NHPA) to comprehend Hopi footprints—to grasp their nature, significance, and meaning for both the Hopi people and the American public. This research program takes advantage of the opportunities provided by the NHPA to explore and document the geographical and temporal range of Hopi ancestral migrations (Bernardini 2005). By investigating Hopi ancestral sites found in a number of project areas close to and distant from the Hopi Reservation, the Hopi Tribe is slowly building important historical knowledge that is valuable for tribal members, and needed by federal agencies for compliance with the NHPA in a manner that is sensitive to Hopi tribal traditions.

Here we summarize the results of a study of Glen Canyon National Recreation Area (GLCA) and Rainbow Bridge National Monument (RABR) conducted by the Hopi Tribe and University of Arizona for the National

Park Service (Figure 1). This study illustrates how the Hopi Tribe uses the federal mandate for historic preservation to engage in archaeological and ethnographic research to increase its participation in the management of heritage resources. Collaborative research is essential for understanding the traditional beliefs and practices of Native Americans that are associated with historic properties, and that are necessary for the perseverance of their cultures. This type of research also educates non-tribal members, ultimately leading to more sophisticated views of history and better preservation practices. Previous studies conducted with the participation of the Pueblo of Zuni in New Mexico (Colwell-Chanthaphonh and Ferguson 2012; Hopkins and Ferguson 2012), the O'odham tribes in Arizona (Darling and Lewis 2008; Johnson et al. 2013) and various other tribes across the U.S. Southwest (Price Steinbrecher et al. 2016) provide examples of these beneficial collaborations.

RESEARCH FRAMEWORK PROVIDED BY THE NHPA

Programmatic agreements executed by the Hopi Tribe, the National Park Service, and other parties specifically recognize the federal government's responsibilities under Section 110 of the NHPA to identify, evaluate, and protect historic properties within National Parks (Hopkins et al. 2013). This study of Hopi history and traditions related to GLCA and RABR was designed by Rosemary Sucec of the National Park Service under Section 110 to provide her agency with the information it needs to effectively manage heritage resources. The Hopi Tribe was interested in participating in this research because it provided an opportunity to document Hopi history and traditions in an area not previously investigated by the Tribe. The research results would thus fill in an-

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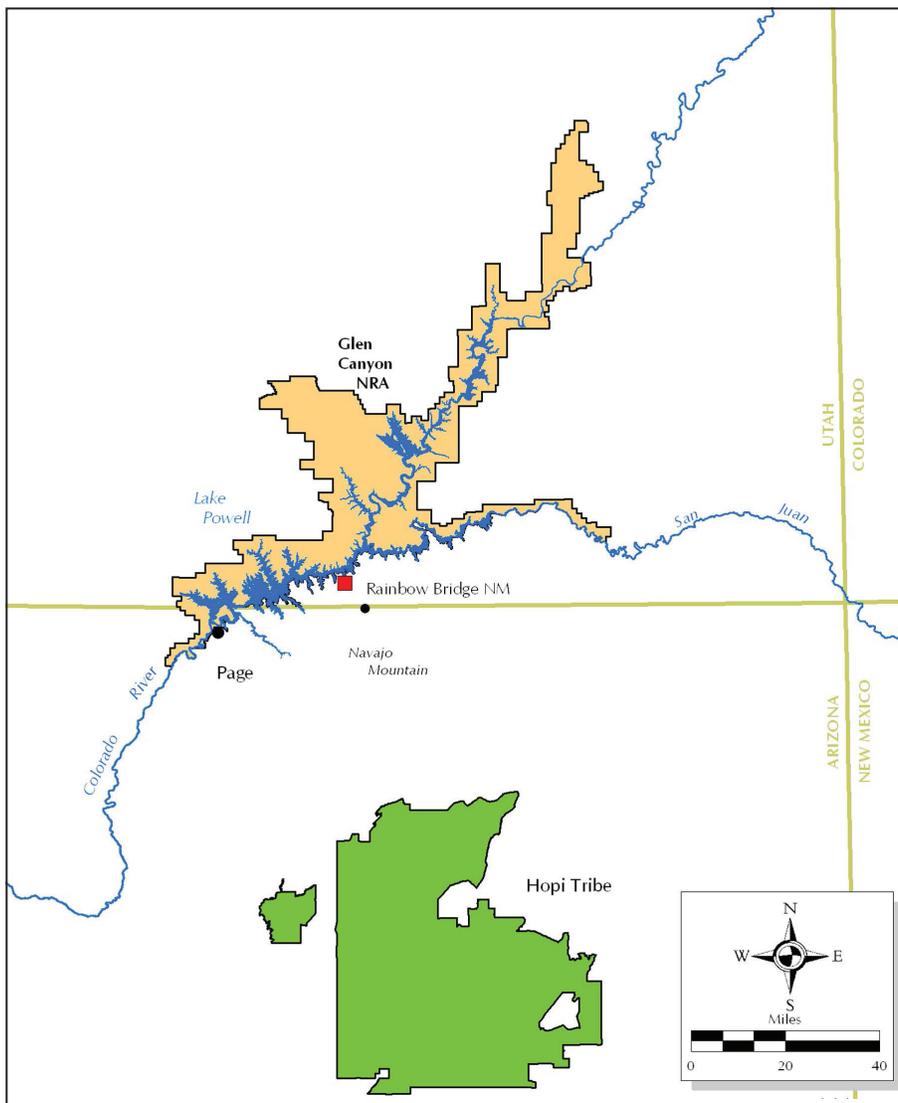


Figure 1. Location of the Hopi Reservation in relationship to GLCA and RABR.



Figure 2. Hopi cultural advisors at Lost Wolf pictograph panel. Left to Right: Noel Rupel, Maren Hopkins, Stewart B. Koyiyumptewa, Rosemary Sucec, Lawrence Namoki, Leonard Talaswaima, Riley Balenquah, Thann Baker, and T. J. Ferguson. Photograph by Jennifer Bishop, June 30, 2011.

other geographical piece of the historical puzzle of Hopi history, and increase understanding of how Hopi ancestral sites articulate in historic preservation and heritage management. The Hopi Tribe ascribes to a cultural landscape approach as a general research protocol for understanding and interpreting cultural and natural resources as interrelated components of Hopi history and cultural traditions.

THESE PLACES SHOULD ALWAYS BE REMEMBERED

Itaakuku—Our Footprints—is a historical metaphor that the Hopi people use to denote the places where the ancestors lived during the long period between emergence and migration to the present villages on the Hopi Mesas (Kuwanwisiwma and Ferguson 2004). Ang kuktota, literally “along there, make footprints,” was one of the instructions that the deity Máasaw gave to the Hopi to demonstrate that they had fulfilled their spiritual obligations as stewards of the land entrusted to them. Today, these footprints are recognized as the architectural remains, pottery, stone tools, petroglyphs and other artifacts that constitute archaeological sites and historic properties.

“These places should always be remembered. We should never forget them,” Leonard Talaswaima remarked during our fieldwork in GLCA. He was one of a team of four Hopi tribal members who conducted research in GLCA and RABR to explicate how Hopi stories and knowledge acquired through generations of travel became an integral part of the Hopi religion, and how the events and places associated with particular clans are maintained through ritual events, prayers, and pilgrimages (Figure 2; Table 1). During our fieldwork, we were able to visit 10 cultural sites and fly over 2 others (Figure 3, Table 2). The information documented during fieldwork was supplemented with knowledge shared in fifteen ethnographic interviews (Table 3). The cultural values and knowledge associated with archaeological sites and historic properties were inherited from clan ancestors, and this heritage is what makes these places

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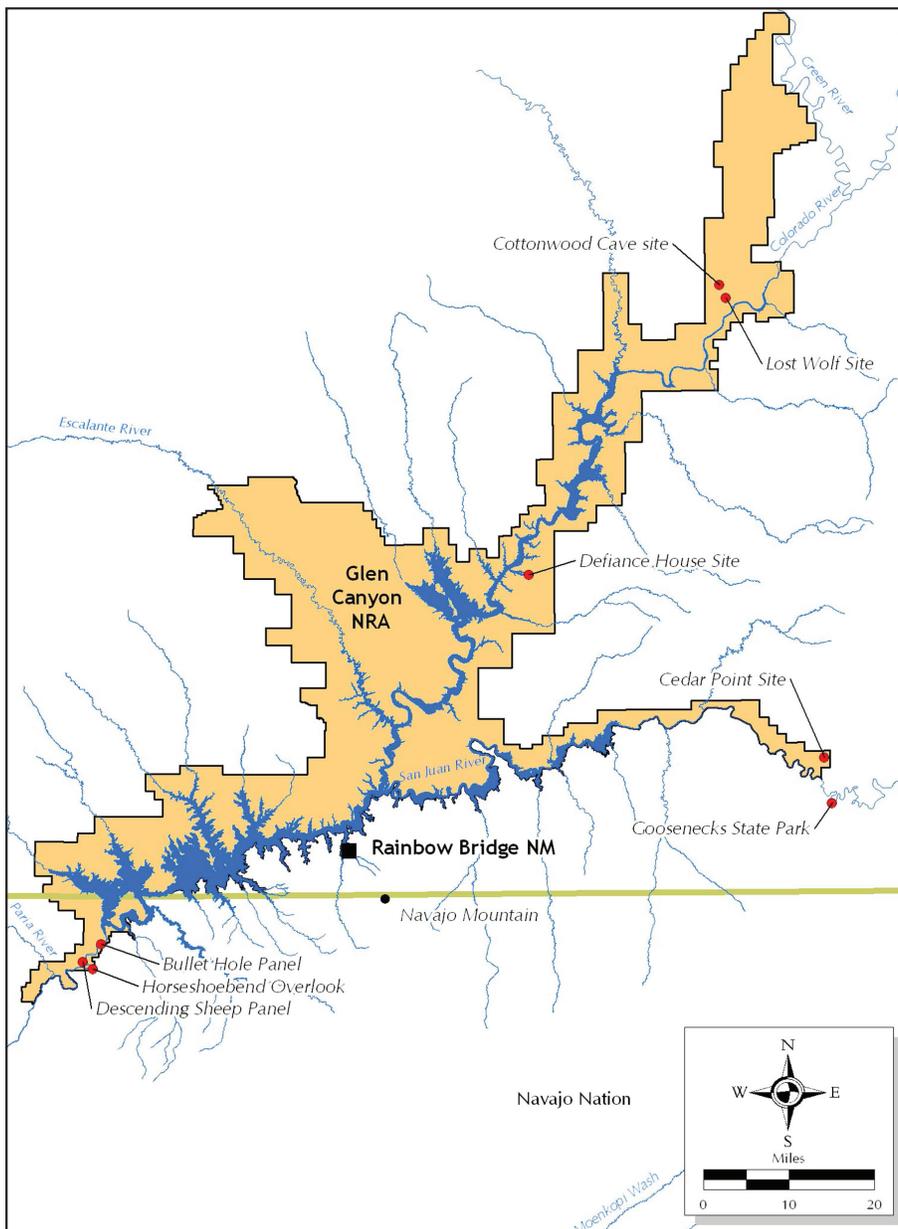


Figure 3. Research stops made during the Hopi land-use and cultural affiliation study at GLCA and RABR are denoted with a red dot. The research team also discussed the cultural significance of Rainbow Bridge and Navajo Mountain during airplane flights near these areas.

doing human history ... a way of constructing social traditions and, in the process, personal and social identities." When indigenous people visit an ancestral landscape that they have not personally experienced before, there is a palpable and immutable process of discovery and revelation that grounds their understanding in traditional history and religious concepts (Morphy 1993). During our research in GLCA and RABR, we found that our work provided a mechanism for the Hopi on our research team to renew their cultural links with specific places that had been forgotten or irregularly visited, and to place these sites into a framework congruent with the NHPA.

HOPI VALUES AND USE OF CULTURAL AND NATURAL RESOURCES

Our work documented 26 Hopi clans with migration histories associated with Glen Canyon, Pisisvayu (Colorado River), Toko'navi (Navajo Mountain), and Namiqw'wunu (Rainbow Bridge) (Table 4). Clan migration histories are complex, and often contain details that are not openly shared with people outside the clan (Hopkins 2012). The general versions of Hopi clan histories that have been published, however, reveal that the Mountain Lion and Dove people were among the first Hopi clans to arrive in the area around Toko'navi, and

traditional cultural properties, as defined in the NHPA (Parker and King 1998).

The Hopi ability to know and interpret ancestral sites is understandable in terms of cultural landscape theory that explains how historical memory is embedded in the land, and how the names of places and their physical manifestation as landforms and cultural sites situate the Hopi people in historical time and space. Storied landscapes provide powerful metonyms of narratives that symbolize and recall the past (Young 1987:4–9). Experiencing places and landscapes, as Basso (1996:7) observed, provides "a venerable means of

Table 1. Hopi Cultural Advisors Involved in Fieldwork at GLCA and RABR

Name	Age	Village	Clan
Riley Balenquah	68	Paaqavi	Tsu'wungwa (Rattlesnake)
Stewart Koyiyumtewa	40	Hotvela	Honanwungwa (Badger)
Lawrence Namoki	60	Wàlpi	Lenwungwa (Flute)
Leonard Talaswaima	64	Supawlavi	Paatangwungwa (Squash)

Table 2. Places Visited During Hopi Research at GLCA and RABR

Place Visited	Date Visited
Gooseheads State Park, Utah/San Juan River	27-Jun-2011
Cedar Point Site (42SA24365)	27-Jun-2011
Horseshoe Bend Overlook, Arizona	28-Jun-2011
Lees Ferry	28-Jun-2011
Colorado River	28-Jun-2011
Bullet Hole Panel (AZ Z:3:6 [ASM])	28-Jun-2011
Descending Sheep Panel (AZ C:2:38 [ASM])	28-Jun-2011
Defiance House (42SA00598)	29-Jun-2011
Cottonwood Cave site (42GA3335)	30-Jun-2011
Lost Wolf Panel (42GA03339)	30-Jun-2011
Rainbow Bridge (fly-over)	01-Jul-2011
Navajo Mountain (fly-over)	01-Jul-2011

they were soon followed by the Rattlesnake, Sand, and Deer clans (Curtis 1922; Fewkes 1900; Mindeleff 1891; Stephen 1936; Voth 1905). Eventually these clans migrated to villages on the Hopi Mesas. Hopi petroglyphs in the Glen Canyon region that date from A.D. 1300 to the present are interpreted by archaeologists as representing revisitation to the area by Hopis, evidence that is supported by the presence of datable Hopi ceramics that are associated both with the petroglyphs as well as other archaeological sites (Adams 1986; Turner 1963). During our fieldwork, we observed Hopi cultural advisors leaving prayer feathers and other offerings at ancestral sites, continuing a long tradition of honoring ancestors and the places that they lived in Glen Canyon.

In addition to ancestral sites, our project documented the plants, animals, water sources and landforms of Glen Canyon that constitute an important part of what the Hopi people cognize as Hopitutskwa—Hopi land (Hedquist and others 2014, Kuwanwisiwma and Ferguson 2014). The springs and water sources, in particular, are cherished resources with spiritual as well as economic importance. The Hopis use many springs as shrines where religious offerings are deposited. As Leonard Talaswaima told us, “We should never forget them. We should honor our ancestors by making prayers and depositing prayer feathers to

honor their gifts today.” The documentation of natural resources with cultural importance to the Hopi people has relevance for future NEPA and NHPA studies.

SIGNIFICANT HOPI HISTORIC PROPERTIES IN GLEN CANYON AND RAINBOW BRIDGE

Here we highlight a few of the historic properties in GLCA and RABR that our study revealed are important to the Hopi people (Figure 3).

Toko’navi (Navajo Mountain) is located south of Glen Canyon and west of Rainbow Bridge (Figure 4). Its massive landform creates an important cultural and visual landmark for the Hopi people. It is here that Tiyo is said to have brought home a snake wife after a harrowing journey down the Colorado River, establishing the Rattlesnake Clan and introducing the Snake Dance into Hopi religion (Hopkins 2012, Secakuku 2006). Today Toko’navi is venerated as a shrine used during the homvi’ikya pilgrimage to make ritual offerings that pay homage to the entire domain of Hopi stewardship.

Namiqu’wunu—Rainbow Bridge—is associated with the Rattlesnake, Flute, Deer, Fire, Bearstrap, and Butterfly clans (Figure 5). A Hopi shrine is known to have been present at Rainbow Bridge before it was submerged during high water levels in Lake Powell (Ferguson 1998; Fewkes 1906). Members of the Hopi clans associated with Rainbow Bridge still visit the area to deposit prayer feathers, and members of the Rattlesnake Clan continue to collect water from a nearby sacred spring. An image of the natural bridge occurs on one of the altars of the Flute Clan.

Table 3. List of Interviewees for the GLCA and RABR Hopi Research Project

Name	Age	Village	Clan	Interview Date
Alph H. Secakuku	72	Supawlavi	Tsu’wungwa (Rattlesnake)	22-Jun-2011
Mervin S. Yoyetewa	57	Musangnuvi	Tsu’wungwa (Rattlesnake)	22-Jun-2011
Floyd Lomakuyvaya	62	Songòopavi	Piqöswungwa (Bearstrap) and Kookyangwungwa (Spider)	02-Aug-2011
Gilbert Naseyowma	75	Munqapi	Taawawungwa (Sun)	04-Aug-2011
Leigh J. Kuwanwisiwma	61	Paaqavi	Tepwungwa (Greasewood)	22-Jun-2011
Lyle Balenquah	36	Paaqavi	Tepwungwa (Greasewood)	15-Sep-2011
Morgan Saufkie	75	Songòopavi	Honwungwa (Bear)	05-Aug-2011
Raleigh H. Puhayaoma Sr.	77	Supawlavi	Qalawungwa (Sun Forehead)	04-Aug-2011
Riley Balenquah	68	Paaqavi	Tsu’wungwa (Rattlesnake)	01-Jul-2011
Leonard Talaswaima	63	Supawlavi	Paatangwungwa (Squash)	01-Jul-2011
Rod Duwala	50	Orayvi	Qa’öwungwa (Corn)	05-Aug-2011
Susan Secakuku	42	Supawlavi	Poovolwungwa (Butterfly)	15-Sep-2011
Wilton Kooyahoema	70	Hotvela	Kookopwungwa (Fire)	02-Aug-2011
Lee W. Lomayestewa	52	Songòopavi	Honwungwa (Bear)	15-Sep-2011
Donald Dawahongnewa	54	Songòopavi	Patkiwungwa (Water)	15-Sep-2011



Figure 4. Toko’navi, seen on the distant horizon, is a central feature of the GLCA and RABR landscape. Photograph by Maren Hopkins, June 29, 2011.

The Hopi name for the Colorado River is Pisisvayu. In the words of Susan Secakuku, Pisisvayu is “a main water thoroughfare, or blood vein.” The watershed that forms the Colorado River has cultural importance because of its role in religious beliefs and practices. “Hopis believe anytime you collect something from the river,” Leonard Talaswaima told us, “you have to honor it by giving back; this is part of the Hopi commitment to stewardship.” One of the many Hopi offering places along the

Table 4. Hopi Clans or Wu’ya Associated with GLCA and RABR

Clan or Wu’ya	Hopi Name	Reference
Antelope	Tsöfngyam	Ferguson 2007
Badger	Honanggyam	Ferguson 2007
Bear	Honngyam	Ferguson 1998, 2007
Bearstrap	Piqösngyam	Ferguson 2007
Bow	Aawatngyam	Ferguson 2007
Burrowing Owl	Kokopngyam	Ferguson 2007
Butterfly	Poovolngyam	Ferguson 2007
Coyote	Isngyam	Ferguson 1998; Sucec 2006
Deer	Alngyam	Ferguson 2007
Dove	Höwingyam	Ferguson 2007
Eagle	Kwaangyam	Sucec 2006
Fire	Kookopngyam	Ferguson 2007
Flute	Lenngyam	Ferguson 2007; Sucec 2006
Greasewood	Tepngyam	This Report
Lizard	Kuukutsngyam	Ferguson 2007; Sucec 2006
Mountain Lion	Tohòongyam	Ferguson 2007
Rattlesnake	Tsu’ngyam	Ferguson 2007; Sucec 2006; Turner 1963
Reed/Bamboo	Paaqapngyam	Ferguson 2007; Turner 1963
Roadrunner	Hospo’ngyam	Ferguson 2007
Sand	Tuwangyam	Ferguson 2007; Sucec 2006
Squash	Paatangngyam	Ferguson 2007
Spider	Kookyangngyam	Ferguson 2007; Turner 1963
Tobacco	Pifngyam	Ferguson 2007
Tit-Mouse	Huktsirongyam	Turner 1963:41
Water	Patkingyam	Ferguson 2007; Turner 1963
Water Coyote	Paa’isngyam	Ferguson 2007

Colorado River is Neneppi Wuansivu, now known as Lees Ferry, where Hopis also hunted and continue to fish. When he visited Pisisvayu during our project, Mr. Talaswaima was inspired to recount Tiyo’s journey, and the deities that helped him along the way, including Huru’ingwúuti (Hard Objects Woman), Kòokyangwso’wúuti (Old Spider Woman), and Pòqangwhoya and Palöngawhoya (the Warrior Twins).

The San Juan River, known to the Hopis as Yotse’vayu, or “Ute River,” is revered because of its association with the Hopi clans descended from the ancestors who are associated with the archaeological cultures of the San Juan valley (Yava 1978:36). As Morgan Saufkie said, “A lot of clan people went up through that area, the Bear Clan went up through there. The San Juan River is our aboriginal land. We claim up the San Juan, our Songòopavi claim (quoted in Albert and Colwell-Chanthaphonh 2007:2–35). Yotse’vayu formed a cultural boundary, with the Utes to the north and the Hopis to the south.

Petroglyph styles and chronologies established by archaeologists in the Glen Canyon area were referenced during our research (Turner 1963). We spent several hours at the Cedar Point Petroglyph Site (42SA24365), near Cedar Mesa, where there are numerous images executed in the San Juan Anthropomorphic Style (Figure 6). Among the images, the Hopi research team identified Qòqlö, a katsina with a duck on his head that appears in the Hopi villages in December (Figure 7). On Second Mesa, Qòqlö is a storyteller associated with the Badger Clan. Other images at the site depicted the Yayat, a Hopi religious society associated with a pole dance where people swing out rope over the edge of mesa while tethered with a rope, and a Kwan priest as-

sociated with the One-Horn Society. Hopi wuuya, or clan symbols, observed at the site included the marks of the Badger, Flute, Greasewood, Rattlesnake, and Reed clans. Hopi deities were also represented in the petroglyphs, including Muy'ingwa (God of Geminataion) and Ma'saw, the owner of the Fourth World. Several petroglyphs were interpreted as maps showing rivers and a route to the mountains. After viewing the petroglyphs, Hopi cultural advisors concluded they are ancestral to Hopi. Riley Balenquah remarked, "I feel comfortable my ancestors were here."

Hopi researchers interpreted variation in the anthropomorphic petroglyphs at the Bullet Hole Panel (AZ C:3:6), executed in the Glen Canyon Linear style, to represent social interaction among different groups of people. Images associated with the Hopi Two-Horn Society were documented at this site. At the Descending

Sheep panel (AZ C:2:38), petroglyphs executed in the Glen Canyon Linear style were interpreted as depicting a hunting party that came into the canyon to hunt game. Hopi researchers thought that these images depicted antelope rather than mountain sheep. At some petroglyph panels, the images were esoteric and Hopi advisors were not willing to discuss them openly.

Hopi researchers spent a morning visiting Defiance House, an Ancestral Pueblo site built into an overhang in Forgotten Canyon (Figure 8). The site consists of a small pueblo with a kiva, and there are distinctive pictographs showing human figures with weapons on the cliff wall above the architecture (Figure 9). Circular pictographs were interpreted as migration symbols indicating how Hopi ancestors came to the site. After a long exploration of the site, Leonard Talaswaima said "This is yufqöyve and it is part of Hopi migration history. When Hopi ancestors were on migrations, they were

instructed by Ma'saw to leave their mark so that the Hopis in the future know where they have been. Yufqöyve is the Hopi word for faraway place, or the "land beyond the horizon." Before leaving Defiance House, Hopi researchers formed a smoking circle and ritually passed around a pipe containing piiva (native tobacco) while they prayed. Feathers were tied onto prayer sticks, and left with an offering of hooma (prayermeal) in a secluded part of the site. The rain that came a short time later was seen by the Hopi research team as answered prayers. One Hopi team member entered the kiva and gently sang a Long Hair katsina song, which



Figure 5. Aerial view of Namiqw'wunu. Photograph by Stewart B. Koyiyumptewa, July 1, 2011.



Figure 6. Leonard Talaswaima points out a "map" of the landscape at the Cedar Point site. Photograph by T. J. Ferguson, June 27, 2011.

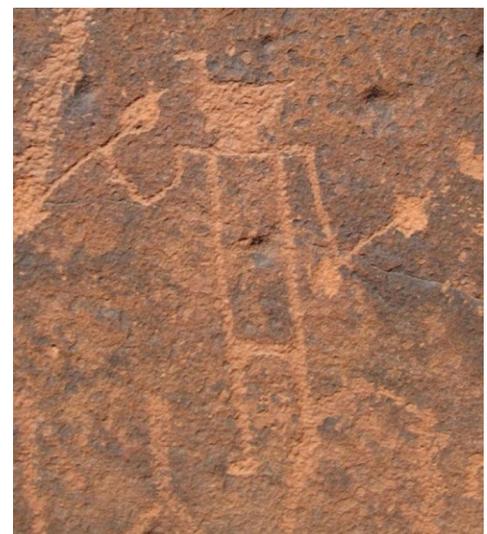


Figure 7. Petroglyph figures at the Cedar Point site remind Hopis of a katsina figure known as a Qöqlö. Photographs by T. J. Ferguson, June 27, 2011.



Figure 8. Defiance House is an Ancestral Pueblo site built into an overhang in Forgotten Canyon. Photograph by T. J. Ferguson, June 29, 2011.



Figure 9. Ancient images of warriors are painted on the walls at Defiance House. Photograph by Maren Hopkins, June 29, 2011.

invoked an important spiritual being associated with moisture. Visiting Defiance House was a moving emotional experience for the Hopi research team, and their ritual activities demonstrate their strong cultural ties to this ancestral site.

At the Cottonwood Cave site in Clearwater Canyon, the Hopis inspected a series of large anthropomorphic pictographs that they thought depicted a family portrait. The stone cysts at this site were interpreted as storage containers for the ancient farmers who painted the im-

ages on the cliff wall, an idea that was reinforced by the manos observed at the site. Lawrence Namoki explained that it was difficult to adequately express the feelings he experienced at Cottonwood Cave. He said the storage pits evoked thoughts of the people who lived at the site and their search for a place to settle in the land that the Creator had provided for them. As with the other ancestral sites, the Hopi research team left prayer offerings here that reinforced the cultural connection between this place and their contemporary religious practices.

Another panel of large anthropomorphic figures, painted on a vertical cliff face in the Barrier Canyon style, was examined at the Lost Wolf Panel (42GA03339). Here the Hopis thought the figures wore ceremonial garb that was reminiscent of that of the Tsa'kwayna, including shell necklaces (Figure 10). This invoked a discussion of how the Tsa'wayna Clan came to the Hopi Mesas from the Rio Grande area. The Tsa'kwayna were warriors and proficient at making rain. There is still a place on First Mesa where the ritual paraphernalia of the Tsa'kwayna ceremony is stored. A serpent depicted alongside one of the figures is associated with water, and similar to a deity of the Water Clan. After a long discussion, the Hopi research team concluded these pictographs were made by bands of people during their migrations, but not from clans that are familiar to Hopis today. The NPS personnel with us at this site discussed recent research that proposes that Barrier Canyon pictograph sites are associated with topographic settings that produce echoes. This prompted Leonard Talaswaima to sing a Hopi song that exhorted the people

listening to come in with a good heart and a happy mood, and be thankful. The echo of this song bounced off the surrounding cliff faces as the research team quietly left the site.

Finally, although they did not visit the Willow Gulch Site (42A04084), the Hopis viewed photographs showing a pictograph panel associated with a small granary and artifact scatter. They remarked about the Kwan (One-Horn) and Aa'alt (Two-Horn) figures that are reminiscent of priests that play a key role in manhood ini-



Figure 10. Pictograph images at the Lost Wolf Panel depict spiritual deities that traveled with Hopi clans. Photograph by Maren Hopkins, June 30, 2011.

tiation ceremonies at Hopi. These figures carry staffs adorned with feathers that symbolize their authority, as depicted in the pictographs.

FUTURE RESEARCH PLANS

The next step in Hopi research at GLCA and RABR is to study a sample of the materials that were collected during the salvage archaeology associated with the construction of Glen Canyon Dam. This work, recently funded by the NPS, will enable Hopi tribal members to conduct research of the Glen Canyon collections curated at the Museum of Northern Arizona and Natural History Museum of Utah. We anticipate that new interpretations of material culture recovered from archaeological sites in the Glen Canyon area will enhance our understanding of Hopi footprints in the Southwest.

CONCLUSION

As the Glen Canyon project demonstrates, the NHPA has increased the participation of the Hopi Tribe in heritage management. Hopi cultural advisors were able to visit ancestral sites in remote areas that they would otherwise not have access to. They identified 33 cultural resources that have traditional associations with the Hopi people. The Hopi researchers explicated how place-names and stories are connected to the land and preservation of Hopi traditional cultural practices. While esoteric elements of these traditional practices need to be protected from dissemination, the documentation of traditional cultural properties is important because it enables the Hopi Tribe to work with the National Park Service and other federal agencies to identify and pro-

tect these heritage sites. Understanding the value of these sites to the Hopi people is essential for the National Park Service to be able to develop appropriate management and treatment measures for them.

In conclusion, we note that the increasing number of Hopi tribal members working as professional archaeologists and ethnographers is changing the paradigmatic basis of our discipline in new and exciting ways. The perspectives that Native Americans offer about the relationships between archaeology, history, cultural patrimony invigorate anthropology by challenging all scholars to acknowledge the limitations of our own values, beliefs, and assumptions, and continuing to work together to expand and improve them. Non-Indian and Indian archaeologists and ethnographers need to continue to collaborate in research, and both groups need to continue working with traditional Native peoples in the study of the past. In so doing, the research being conducted for and by Native Americans under the auspices of the NHPA will help to restructure our discipline and enrich our intellectual understanding of the archaeological record.

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MAKING ARCHAEOLOGICAL DATA AND INFORMATION DISCOVERABLE, ACCESSIBLE, AND USABLE FOR 21ST CENTURY RESEARCH: THE THEODORE ROOSEVELT DAM ARCHAEOLOGICAL PROJECT, TONTO BASIN, ARIZONA

Francis P. McManamon
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ABSTRACT

The Center for Archaeology and Society (CAS), the Phoenix Area Office of the Bureau of Reclamation, and the Center for Digital Antiquity (DA) have created and are making freely available, via tDAR (the Digital Archaeological Record), a large collection of reports, articles, and data sets resulting from the archaeological investigations undertaken for the Theodore Roosevelt Dam project in the Tonto Basin of central Arizona. At present, this tDAR collection includes over two dozen volumes (more than 11,200 pages), plus several articles that present the results of the investigations undertaken as a part of the Roosevelt Dam project. In addition, we present 205 spreadsheets of key data tables extracted from the comprehensive database of the largest of these projects (the Roosevelt Platform Mound Study [RPMS]) along with the complete database of archaeological data for that project. We intend to continue to expand this collection, especially with databases and extracted spreadsheets from the other two projects. Making the collection of data and information available in tDAR allows anyone with an Internet connection to benefit from unlimited, text-searchable access to the full set of reports that represents core documentation of the Salado phenomenon, important aspects of the ancient Hohokam culture, and a detailed case study of the economic and social organization of village-scale human societies. By providing access to key data tables and the full database we hope to facilitate and stimulate comparative studies and additional analysis of this enormous set of data that will further advance our knowledge of these ancient cultures and the workings of human societies more generally.

INTRODUCTION

Recognizing the value of the Nation's cultural heritage, the National Historic Preservation Act (NHPA) seeks to mitigate the damage to or loss of significant archaeological resources resulting from federal undertakings. The basic idea, of course, is that the physical loss is mitigated by rescuing the information that those resources have to contribute. To satisfy the goals of

NHPA—which is to say, in order for the mitigation to be truly effective—two conditions must be satisfied. First, the data recovered in the field must be transformed into knowledge that contributes to understanding our Nation's past. Second, the data and information obtained must be effectively preserved for future use.

The first condition is primarily satisfied through the production and distribution of project reports. The professionals doing the field work are responsible for documenting the archaeological investigations and for analyzing and synthesizing the data in a way that it becomes knowledge about the past. However, the contributions of even the best of reports are usually attenuated by their quite limited distribution.

The second condition, the preservation of the data for future use, has two components: (1) the curation of the physical objects recovered and associated field and lab paper records in a recognized repository that can curate the artifacts and paper records appropriately; and (2) the preservation and dissemination of the data and information learned from the project in forms that can be reanalyzed to reassess the initial results or to address new research questions. The latter component traditionally was accomplished by publication of descriptive project reports that include rich data tables or appendices. However, with the continual refinement of archaeological methods and the explosion in the kinds and detail of data recorded, even the most detailed traditional reports are not effective means of conveying data and information for reanalysis and reuse. The Digital Archaeological Record (tDAR) repository where the digital documents and data sets described in this article are archived is easily accessible via the Internet and provides a search capability that distinguishes it from physical repositories and provides a unique and better means of fulfilling the goals of NHPA.

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In this article we focus on the two challenges identified above, effective dissemination of the knowledge gained from archaeological investigations, in particular those related to data recovery projects that mitigate the adverse impacts of development projects, and preserving and making available the data and information obtained in order that our understanding of the past can continue to benefit from completed projects. We do this in the context of one of the largest archaeological impact mitigation programs ever undertaken by the United States government, the Theodore Roosevelt Dam project in central Arizona. This is a fitting context, as these issues are all the more important for very large and very expensive, well designed, and expertly executed projects that take on major questions.

By showing how we are addressing these problems for the Theodore Roosevelt Dam project, we hope both to present a case study that may aid similar efforts for other projects and to publicize and document what we have done with the Roosevelt project in order that the project data, information, and knowledge will continue to be used to advance our understanding of the past.

The Center for Archaeology and Society (CAS; <https://shesc.asu.edu/research/centers/center-archaeology-and-society>), the Phoenix Area Office of the Bureau of Reclamation, and the Center for Digital Antiquity (DA; <http://www.digitalantiquity.org/>) at Arizona State University have created and are making freely available, via tDAR, a large collection of reports, articles, and data sets resulting from the archaeological investigations undertaken for the Theodore Roosevelt Dam project in the Tonto Basin of central Arizona: <https://core.tdar.org/collection/59352/theodore-roosevelt-dam-archaeological-project>.

At present, this tDAR collection includes over two dozen volumes (more than 11,200 pages), plus several articles that present the results of the investigations undertaken by different organizations as a part of the Roosevelt Dam project. In addition, we present 205 spreadsheets of key data tables extracted from the comprehensive database of the largest of these projects (the Roosevelt Platform Mound Study [RPMS]) along with the complete database of archaeological data for that project. We intend to continue to expand this collection, especially with databases and extracted spreadsheets from the other two projects.

TDAR – A DIGITAL REPOSITORY FOR DATA DISCOVERY, ACCESS, AND USE

Driven by the need to solve a major research challenge in archaeology—how to synthesize systematically collected data recorded using different coding conventions, across multiple sites and data sets, archaeologists at ASU, led by Kintigh, began the conceptual development of tDAR in 1999. In 2004, the National Science

Foundation funded a planning workshop with 31 participants drawn from archaeology and computer science. The workshop developed recommendations concerning archaeology's need for an information infrastructure (Kintigh 2006). Based on these recommendations, in 2006, NSF funded development of a prototype digital information infrastructure—tDAR, the Digital Archaeological Record. This research developed and deployed a prototype infrastructure for synthetic and comparative research based on a novel strategy of query-oriented, on-the-fly, ontology-based data integration.

The Andrew W. Mellon Foundation's interest in supporting scholarly communication among archaeologists led it, in 2006, to convene a multi-institutional group of archaeologists to plan the development of a digital repository for archaeological data. This led to a planning grant that the Foundation funded in 2007. The grant focused on developing an organizational structure and business model that could support a self-sufficient digital repository centered on preservation and access. The planning grant resulted in substantial additional funding by the Mellon Foundation for the creation, in 2009, of the Center for Digital Antiquity at ASU and the transformation of tDAR into a publicly available digital repository in 2010.

DA's goals are to serve archaeologists, researchers from other fields, and the interested public by providing, at no cost, broad and easy discovery of and access to archaeological and archaeologically-related data and information and to ensure the long-term preservation and availability of these data and information for future use. The Center builds content and manages tDAR's development, maintenance, and financial and technical sustainability (McManamon and Kintigh 2010). The Mellon Foundation has provided additional grants to support these efforts. DA also obtains revenue by collecting modest upload fees for content deposited in tDAR and by providing digital curation services to a wide range of individual researchers, organizations, and public agencies that require a repository in which they can manage access to and preservation and use of their data. Clients as varied as the Eastern Mimbres Archaeological Program, the North Atlantic Biocultural Organization, the Maryland Archaeological and Conservation Laboratory, Archaeological Consulting Services, Ltd., Logan Simpson Design, Inc., the PaleoResearch Institute, the SRI Press, the Bureau of Land Management, the National Park Service, the US Air Force, and the US Army Corps of Engineers make use of tDAR.

Since its September 2010 public production launch, tDAR has become an important resource for meeting the data discovery, access, management, and preservation needs of diverse researchers, contractors, and cultural resource managers. Over 10,600 users have registered to download resources from tDAR and over 320 individuals and organizations have deposited data in tDAR. Content grows daily. tDAR contains data and informa-

tion from all seven continents, including 371,000 bibliographic records; nearly 10,000 full text documents; 19,800 images, 158 3D scans, 85 geospatial data files, and more than 1,000 datasets supported with 1,300 coding sheets and 50 ontologies. tDAR is designed to enable archaeologists to upload directly and create metadata that documents their documents, images, data sets, and other files using self-explanatory on-line templates (<http://www.tdar.org/why-tdar/contribute/>). Alternatively, depositors can take advantage of digital curation services offered by DA staff experts.

Regarding the Theodore Roosevelt Dam Archaeological Project data in tDAR, anyone with an Internet connection can benefit from unlimited, text-searchable access to the reports and data sets that represents core documentation of the Salado phenomenon, important aspects of the ancient Hohokam culture, and a detailed case study of the economic and social organization of village-scale human societies. Further, by providing access to key data tables and the full database we hope to facilitate and stimulate comparative studies and additional analysis of this enormous set of data that will further advance our knowledge.

THE THEODORE ROOSEVELT DAM ARCHAEOLOGICAL PROJECT

Between 1989 and 1993, the US Bureau of Reclamation funded four substantial field archaeological projects in the Tonto Basin, all associated with the modification of the Theodore Roosevelt Dam that would raise the lake level. Most of these investigations were carried out on lands administered by Tonto National Forest. Earlier archaeological surveys in the area around Roosevelt Lake had identified hundreds of sites that likely would be affected as a result of the dam modification (Fuller et al. 1976; Jewett 1986; Rice and Bostwick 1986), many of which were expected to be eligible for the National Register of Historic Places. Therefore, to comply with Section 106 of the National Historic Preservation Act (NHPA), the Bureau of Reclamation, the lead agency for the undertaking, determined to mitigate the adverse effect to the archaeological resources by a large-scale data recovery effort. The reports, other documents, and data described and made available in this tDAR collection are the results of this effort.

The data recovery program was divided into four projects, each of which had different research objectives and were conducted by separate research teams that coordinated their activities (Pedrick 1992:2-3; Rice and Lincoln 1998:1-3).

The Roosevelt Bajada Survey (RBS) was a sampling survey by SWCA Inc. of portions of the bajada and foothills surrounding Tonto Basin (Ahlstrom et al. 1991). The Roosevelt Rural Sites Study (RRSS) conducted by Statistical Research focused on small agricultural and

habitation sites in the rural areas away from the large settlements in the basin (Ciolek-Torrello et al. 1990). Desert Archaeology Inc. of Tucson was responsible for the Roosevelt Community Development Study (RCDS), and their aim was to provide a longitudinal record of the history of occupation of Tonto Basin (Doelle et al. 1992). The Roosevelt Platform Mound Study (RPMS), conducted by the Office of Cultural Resource Management at Arizona State University (ASU), studied the organization of Classic period platform mound complexes (Rice 1990). As the study progressed, Reclamation modified the Platform Mound Study to include the investigation of a series of 44 sites on the bajada that had been identified in the survey conducted by SWCA (Rice and Lincoln 1998:1).

The location of the studies covered by this tDAR collection are shown on Figure 1. Much of the research conducted by the four studies focused on the time period between about A.D. 1150 and A.D. 1450, referred to as the Classic Hohokam period (Pederick 1992:1). Rice (1998:231) estimated that three quarters of the sites investigated by the RPMS, the largest project among the four conducted, dated to the Classic period. Research on other time periods also was conducted. For example, the RCDS covered a much greater time depth by design, including pre-Hohokam, although its main focus was the period A.D. 1 to 1450. The RCDS research included investigation of an important pre-Hohokam village.

tDAR's digital collections from the Theodore Roosevelt Dam Archaeological Project are organized in sub-collections that generally match the organization of the different studies that conducted and reported the original fieldwork and research (Table 1).

THE ROOSEVELT PLATFORM MOUND STUDY (RPMS)

The largest sub-collection is the RPMS. This collection contains all the reports of the Roosevelt Monograph Series (12 volumes), the complete 63 MB Access database of archaeological data for that project, and over 200 smaller data sets created from the abundant research information collected at the sites and multi-site areas investigated as part of the archaeological study. The RPMS sub-collection is organized into nine further sub-collections that distinguish among the major sites and areas tested and excavated. The RPMS sub-collection also includes the project research design, background research documents, the comprehensive laboratory manual, three large reports that synthesize the research, and several short articles on various aspects of the research (Table 1).

The RPMS examined the physical and social organization of three Classic Hohokam period community complexes in the Tonto Basin of Arizona. The data come from the project's investigation of 79 prehistoric sites

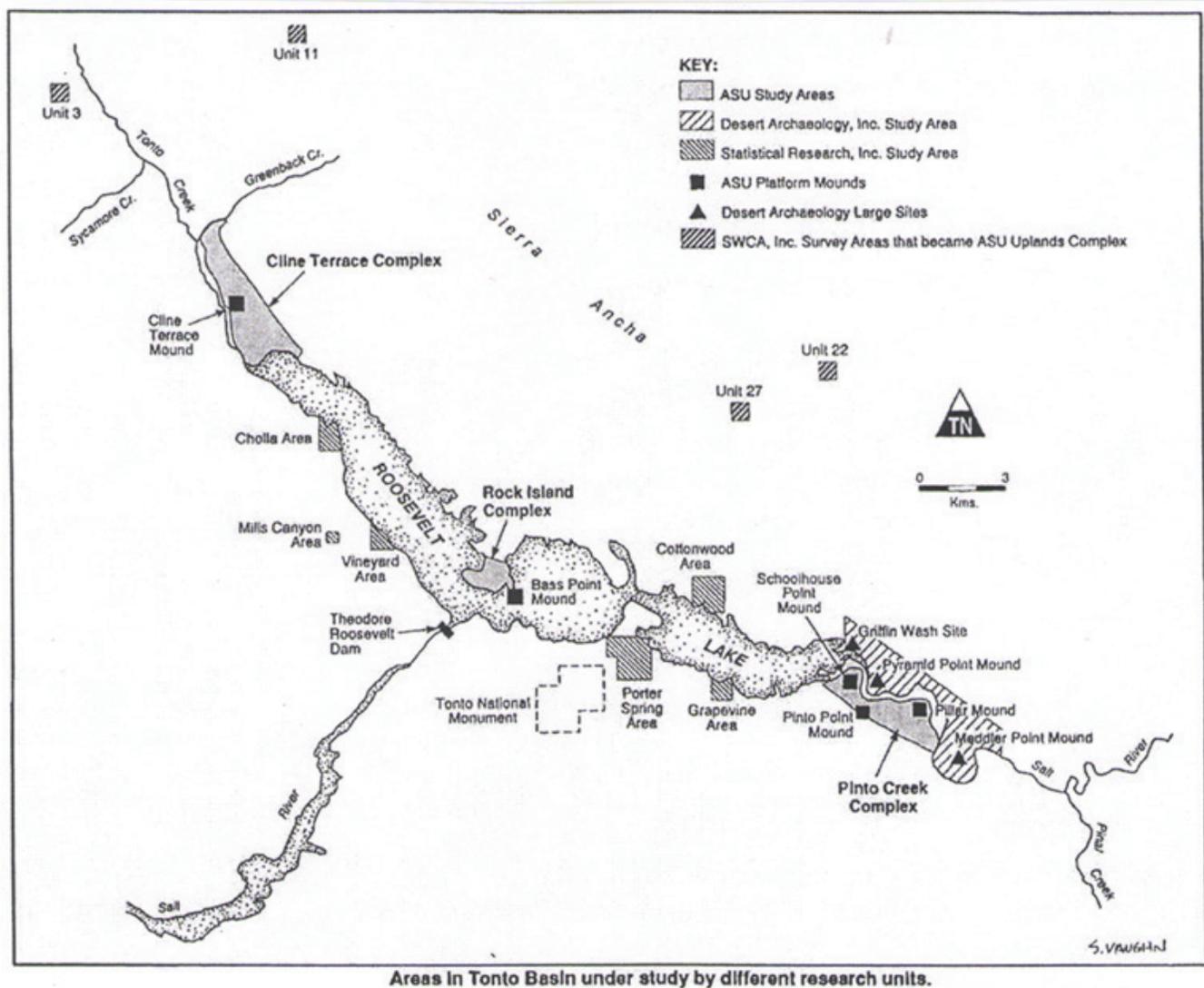


Figure 1: The general location of the studies described in this article.

arranged in three spatial clusters around the current Lake Roosevelt, known as Pinto Creek, Cline Terrace, and Rock Island. Excavations also were conducted on a few sites north of the Lake, referred to as the Upland Complex. There are many sites in other clusters that were not investigated by this project. The field work, lab processing, analysis, and reporting was carried out between 1989 and 1998. Field studies lasted approximately four of these years.

The RPMS tDAR collection includes sub-collections for the major site areas excavated and tested. There are two sub-collections each for the Pinto Creek sites and the Cline Terrace sites with the site reports and data sets. The Rock Island and Upland sites have one sub-collection apiece also containing the site reports and data sets for these areas. The RPMS tDAR collection includes a sub-collection containing the project research design, a collection of articles on Tonto Basin prehistory, and the project field and laboratory manuals. The final sub-

collection of the set contains reports on topics cross-cutting site descriptions and data, including: environment and subsistence, ceramics and social organization, and a synthesis of Tonto Basin prehistory. This sub-collection also includes several shorter summary articles and the RPMS Access database and users' guide.

The RPMS research focused on the nature of social organization and economic activities and how these changed over time prior to, during, and subsequent to the Classic period. Rice (1998:231-234) describes the development of sedentary agricultural villages about A.D. 200 and notes two subsequent movements of new people into the Basin. About A.D. 750, people associated with the Hohokam tradition arrived, probably from the west and southwest. They brought with them different ways of organizing settlements and constructing dwellings, the use of cremation as a burial practice, and a variety of different kinds of artifacts and artifact styles. Beginning at the end of the 13th century (A.D. 1280 to

Table 1. Theodore Roosevelt Archaeological Project tDAR Collection. Sub-collection Contents and Organization

Lake Roosevelt and Tonto Basin Sub-collections	Number of Documents	Number of Data Sets
Roosevelt Platform Mound Study (RPMS)	18	206
RPMS: A Design for Salado Research, Developing Perspectives on Tonto Basin Prehistory, and the RPMS Field and Laboratory Manuals	3	--
RPMS: Pinto Creek Complex, Livingstone Area Sites, Pillar Mound, Pinto Point Sites, and Pinto Point Mound	1 (2 volumes)	83
RPMS: Pinto Creek Complex, Schoolhouse Point Mound	1 (2 volumes)	16
RPMS: Pinto Creek Complex, Schoolhouse Mesa Sites	1	24
RPMS: Rock Island Complex	1	13
RPMS: Cline Terrace Mound	1	18
RPMS: Cline Terrace Complex, Cline Mesa Sites	1	27
RPMS: Uplands Complex	1	24
RPMS: Synthesis of Research, Summaries of Environment, Subsistence, Salado Ceramics, and Social Organization, Summary Articles and Other Documents, Users Guide to the Project Access Data Set, and Access Data Set	8	1
Roosevelt Community Development Study	7	--
Roosevelt Rural Sites Study	5	--

1320), a second substantial movement of people into the Basin occurred. These immigrants seem to have come from the mountains surrounding the Basin and possibly also from the Hohokam region to the south and southwest. Some of the new people seem to have been associated with pueblo cultures originally living to the east and north of the Basin. This later immigration resulted in the establishment of two distinct kinds of settlement patterns in the Basin. One of these was associated with centers that contained platform mounds. The other pattern had a large primary village surrounded by clusters of small, dispersed settlements.

One of the key interpretive results of the RPMS research was that although Classic period settlements and associated communities were large, the amount and range of control over these communities by their leaders was surprisingly limited. Rice summarizes the relationship that seems to have existed between communities and their leaders:

Platform mound were centers that held together the elements of a dispersed settlement system, but the basis for this integration was ideological, not administrative. By the 14th century, platform mounds were the residences of elite members of the community...The people who occupied [these residences] ... included specialists responsible for conducting and preparing ceremonial activities, but the basis for their status did not extend to heightened economic privileges or responsibilities (Rice 1998:237).

THE ROOSEVELT COMMUNITY DEVELOPMENT STUDY (RCDS)

The RCDS tDAR sub-collection contains six reports. The community development study was carried out by the Center for Desert Archaeology. The reports describe the developments over time related to prehistoric populations residing at and utilizing several sites within the project area. The RCDS investigations involved the testing and excavation of 27 sites located in a 4-mile study area along the north side of the Salt River at the east end of Lake Roosevelt. Six sites were intensively examined through full-scale excavation. In addition, extensive data were gathered at the remaining 21 sites (Doelle 1992:1-4).

The RCDS project area contained three large Classic period sites, two of which have platform mounds. The third site may contain over 100 masonry rooms. From west to east, these large sites are the centers of the Griffin Wash, Pyramid Point, and Meddler Point site complexes. The main sites of the three complexes were occupied during the Roosevelt phase (ca. AD. 1150-1300). Only Griffin Wash yielded definitive late Classic, or Gila phase (ca. AD. 1300-1450), ceramics. Examination of the other sites in the RCDS study area indicated that many of them were occupied during the Roosevelt phase. Earlier material is well represented at Meddler Point and is likely to be present at a number of other sites as well. At Meddler Point, there appears to be sufficient horizontal stratigraphy to permit broad-scale access to deposits that date at least as early as the Gila Butte phase (ca. AD. 750- 850).

The RCDS results are described in four sets of reports in the Center for Desert Archaeology publication series, Anthropological Papers No. 12, 13, 14, and 15. The first is a single volume that includes the research design for the overall investigation. Anthropological Papers No. 13 consists of two volumes that provide information about the project background and descriptive information on the excavation and testing of sites in the project area. These volumes include site and feature descriptions, site and feature maps, general artifact data, and preliminary interpretations of individual sites. The first volume discusses the project and describes work at the small sites in the project area. The second describes the work done at the larger sites: Meddler Point, Griffin Wash and Pyramid Point Sites. Anthropological Papers No. 14 includes three report volumes that describe artifact data and specialized analyses. The topics covered are stone and shell artifact analyses; ceramic chronology; technology; economics; paleobotanical analysis; and osteological analyses. Anthropological Papers No. 15 is a single report that integrates the RCD data and provides a synthesis of the prehistoric occupation of the RCDS project area and the Tonto Basin (Doelle 1992:1-4).

THE ROOSEVELT RURAL SITES STUDY (RRSS)

The RRSS tDAR sub-collection contains four volumes describing the field work and other research conducted for this study by Statistical Research, Inc. (SRI). The reports were published as part of the SRI Technical Series. The RRSS was designed to study small habitation, agricultural, and resource processing sites, located away from the main centers of prehistoric habitation in the Tonto Basin. This study complements the other studies and contributes to the overall synthetic study of Tonto Basin prehistory.

The specific research focus of the RRSS was documenting the change over time of prehistoric rural land-use systems in the Tonto Basin (Ciolek-Torrello, et al 1990:1-3). The RRSS investigated 29 prehistoric sites grouped into six study areas located in the bajada zone surrounding the lake. The first report presents the investigation's research design. The second volume documents the results of site excavations and material culture analyses and describes a preliminary model of rural settlement types and changes in rural settlement and subsistence during the Formative period in the Tonto Basin. The third report presents the results of archaeobotanical, soil, and paleoclimatic analyses. These results are examined within an interpretive framework developed from an examination of records pertaining to ethnographic, ethnohistoric, and historic land-use in central Arizona. This final volume concludes with several chapters synthesizing the results of the specific environmental and archaeological aspects of the RRSS.

FUTURE USES OF THE ROOSEVELT ARCHAEOLOGY RESEARCH DATA

An enormous amount of data was collected by these Roosevelt Lake project archaeological studies. The three projects collected more than 4000 boxes of artifacts including more than 700,000 potsherds. In addition to the reports, these investigations are documented by 330 linear feet of archives. These data were intensively used by the projects to develop and test important hypotheses about the social organization, economic practices, population movements, and cultural and social change.

Summarizing the RPMS synthesis report, Rice noted that

The Roosevelt archaeology projects amassed data on a truly remarkable scale, and those data were used to test a number of hypotheses about prehistoric society...the results led to unexpected views on how the populations of the Tonto Basin were organized and how they related to the populations of surrounding regions. Several of the hypotheses...dealt with the degree of cooperation that ought to occur between settlements in trade or subsistence, positing that there was either a lot or only a little cooperation. None of the hypotheses prepared us, however, for the finding that the relationships among settlement were often highly competitive. People of the Tonto Basin competed for agricultural land, trade contacts, and ultimately for the occupancy of the basin itself (Rice 1998:231).

Users of the Theodore Roosevelt Dam Archaeological Project tDAR collection have the opportunity to absorb, utilize, and reexamine the important interpretations of the various studies provided in the existing reports. They are also able to access and use the formidable datasets derived from these investigations to address new questions of broad significance, including many from the Grand Challenges for Archaeology (Table 2 and Kintigh et al. 2014a and b).

The potential impact of future research utilizing the extensive Theodore Roosevelt Dam project content in tDAR, is greatly enhanced by the tDAR's other rich holdings on Hohokam and Salado archaeology. In addition to the Roosevelt Lake materials, tDAR already has more than 200 Hohokam and Salado reports with more than 35,000 pages (e.g., see the Phoenix Basin Archaeology: the Intersections Project tDAR collection, <https://core.tdar.org/collection/29291/phoenix-basin-archaeology-the-intersections-project>).

tDAR's value for comparative and synthetic research will continue to grow as more organizations and researchers deposit their documents and data in tDAR.

Table 2 . Grand Challenges for Archaeological Research**A. Emergence, Communities, and Complexity**

1. How do leaders emerge, maintain themselves, and transform society?
2. Why and how do social inequalities emerge, grow, persist, and diminish, and with what consequences?
3. Why do market systems emerge, persist, evolve and, on occasion, fail?
4. How does the organization of human communities at varying scales emerge from and constrain the actions of their members?
5. How and why do small-scale human communities grow into spatially and demographically larger and politically more complex entities?
6. How can systematic investigations of prehistoric and historic urban landscapes shed new light on the social and demographic processes that drive urbanism and its consequences?
7. What is the role of conflict—both internal factional violence and external warfare—in the evolution of complex cultural formations?

B. Resilience, Persistence, Transformation and Collapse

1. What factors have allowed for differential persistence of societies?
2. What are the roles of social and environmental diversity and complexity in creating resilience and how do their impacts vary by social scale?
3. Can we characterize social collapse or decline in a way that is applicable across cultures, and are there any warning signals that collapse or severe decline is near?
4. How does ideology structure economic, political, and ritual systems?

C. Movement, Mobility, and Migration

1. What processes led to, and resulted from, the global dispersal of modern humans?
2. What are the relationships among environment, population dynamics, settlement structure, and human mobility?
3. How do humans occupy extreme environments, and what cultural and biological adaptations emerged as a result?
4. Why does migration occur and why do migrant groups maintain identities in some circumstances and adopt new ones in others?

D. Cognition, Behavior, and Identity

1. What are the biophysical, sociocultural, and environmental interactions out of which modern human behavior emerged?
2. How do people form identities, and what are the aggregate long-term and large-scale effects of these processes?
3. How do spatial and material reconfigurations of landscapes and experiential fields affect societal development?

E. Human-Environment Interactions

1. How have human activities shaped Earth's biological and physical systems, and when did humans become dominant drivers of these systems?
2. What factors drive or constrain population growth in prehistory and history?
3. What factors drive health and well-being in prehistory and history?
4. Why do foragers engage in plant and animal management, and under what circumstances does management of a plant or animal lead to its domestication?
5. Why do agricultural economies emerge, spread, and intensify, and what are the relationships among productive capacity, population, and innovation?
6. How do humans respond to abrupt environmental change?
7. How do humans perceive and react to changes in climate and the natural environment over short- and long-terms?

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THE ROLE OF SYNTHESIS IN AMERICAN ARCHAEOLOGY AND CULTURAL RESOURCE MANAGEMENT AS SEEN THROUGH AN ARIZONA LENS

Jeffrey H. Altschul

ABSTRACT

Since the passage of the National Historic Preservation Act in 1966, American archaeology has been transformed from an academic discipline to a service industry that provides regulatory compliance. Much like the rest of the nation, Arizona has benefited from the identification and excavation of thousands of archaeological sites. We have learned much about what happened in the past. We have not, however, been as successful in synthesizing the new data into new understandings of why humans behaved as they did in the past and how such understandings can help society confront the key issues of our day. After reviewing the last 50 years of synthetic research in Arizona, I offer a path forward to integrate archaeology and archaeologists with other sciences and scientists to address critical issues whose solutions require a time horizon which only archaeology can provide.

It is a curious fact that the law with the greatest impact on American archaeology, the National Historic Preservation Act (NHPA), received only scant support from archaeologists when it was being written, debated, and ultimately enacted in 1966. NHPA was largely the creation of historians, architectural historians, and historic preservationists alarmed by the destruction of the historic urban fabric caused by redevelopment projects and highway construction. Archaeologists, contacted late in the process, remained largely noncommittal about the law (Townsend 1994). Indeed, it was not entirely clear at the outset how NHPA would affect American archaeology or even if the effect would be positive. It was not until allied laws and regulations, such as the National Environmental Policy Act (NEPA) (1969), the Archaeological and Historic Preservation Act (AHPA) (1974), and Section 106 regulations (36 CFR, Part 800) (1974) were enacted and the framework that governs historic preservation became firmly established that the importance of what became known as cultural resource management (CRM) on American archaeology was as-

sured (see McGimsey 2004, McManamon 2014). Even then, few anticipated that CRM would grow to dominate American archaeology.

The dominance of CRM is most starkly portrayed in the economics and demography of American archaeology. In 1968, federal agencies reported expenditures of \$1.7 million on CRM (Knudson and McManamon 1992), which was roughly in balance with the support archaeology received from the National Science Foundation (NSF) (Rocks-McQueen 2014). Today, we spend close to a billion dollars annually on CRM in the United States, much of which is spent on archaeology; only about \$25 million is spent on academic research in archaeology (Altschul and Patterson 2010:297). Jobs have followed funding. In 1956, there were 976 members of the Society for American Archaeology (SAA) (Altschul and Patterson 2010:305). Although data do not exist, I presume that the overwhelming majority of SAA members at that time held academic positions, followed at some distance by those employed in museums and government agencies. In 1973, shortly after the passage of NHPA, NEPA, and issuance of Section 106 regulations, the number of SAA members grew to 3,916. Again, no data exist on employment, but presumably most SAA members at this time continued to work in academic institutions. In 2015, the SAA had doubled in size again, but now professional members were evenly split between CRM and academic employment (Society for American Archaeology 2010). In 2008, I estimated that there were about 14,000 full-time equivalent (FTE) jobs in CRM in the United States, of which approximately 10,000 FTEs were archaeological positions; my co-author, Tom Patterson, estimated that at the time there were roughly 1,500 academic positions (Altschul and Patterson 2010:311). If our estimates are correct, it follows that during the 52 years from 1956 to 2008, the number of archaeologists in the United States grew from around 1,000 to 11,500

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(or an annual growth rate of nearly 5 percent), with a shift in employment from about 85 percent in academia in 1956 to about 85 percent employed in CRM in 2008.

There is no question that CRM has been the driving force in the growth of American archaeology over the last 50 years. But growth is not the only or even the best measure of success. Perhaps a better question to ask is: what have all the archaeologists and all that money spent on archaeology contributed to our society? And, if we are not satisfied with the answer to that question, how do we change course? In this paper, I explore these topics from my personal perspective of having been one of the original group of CRM entrepreneurs in Arizona and offer my vision of the future.

THE PUBLIC COMPACT

I began my career in the Southwest at the Field Museum of Natural History's field school at Vernon, Arizona, in 1973. I went on to study Chaco Canyon and Chacoan archaeology before turning my attention in graduate school to Mesoamerica. Like many of my generation, I was first exposed to CRM as a graduate student, when I was desperately trying to augment my income. In the Northeast and then the Southeast United States, I worked my way up the CRM ladder from field crew to project director. As a child of the Vietnam War era, I wanted my work to be relevant to the social issues of the day. It was not long before my interest shifted from academic research to CRM's applied focus of balancing economic development with historic preservation. Much to the chagrin of my mentors, upon finishing my dissertation, I turned down an academic position to take a job with a fledgling CRM consultancy.

My abiding interest and passion for CRM are encapsulated in the first four bullets of Section 1 of NHPA (<http://www.nps.gov/history/local-law/nhpa1966.htm>, accessed March 17, 2016):

The Congress finds and declares that-

1. The spirit and direction of the Nation are founded upon and reflected in its historic heritage;
2. The historical and cultural foundations of the Nation should be preserved as a living part of our community life and development in order to give a sense of orientation to the American people;
3. Historic properties significant to the Nation's heritage are being lost and substantially altered, often inadvertently, with increasing frequency;
4. The preservation of this irreplaceable heritage is in the public interest so that its vital legacy of cultural, educational, aesthetic, inspirational, economic, and energy benefits will be maintained and enriched for future generations of Americans. . .

I view NHPA and other laws and regulations that form the basis of CRM as an implicit compact between

archaeologists and the public. Essentially, this compact holds that with public support, archaeology will:

- Identify and protect places of value
- Balance economic development with historic preservation
- Share knowledge about the past gained through archaeological studies in ways that benefit society

If such a compact exists, how have we done? I think there are several proxy measures that can be used to provide a basis for evaluating the last 50 years of publicly supported CRM. Table 1 presents information taken from the data accompanying the Secretary of the Interior's Report to Congress (SRC) on the Federal Archaeology Program (<http://www.nps.gov/Archeology/src/index.htm>, accessed March 17, 2016)¹. The SRC is based on a questionnaire completed by federal agencies and coordinated through the National Park Service (Knudson and McManamon 1992). Although it began earlier, the SRC became more standardized and the results more reliable beginning in 1985. The last year that currently has been reported is 2012. Consequently, the analysis below is based on the 28-year period from 1985 until 2012.

By any measure, the growth in American archaeology in the last three decades has been substantial. The number of field projects has grown at an annual rate of more than 15 percent (Figure 1), followed only slightly behind by the number of acres surveyed and the number of sites recorded. The absolute numbers alone are staggering: 132 million acres surveyed, 807,244 archaeological field projects performed, and 839,660 sites recorded. In just the period between 1998 and 2012, federal agencies sponsored more than 30,000 data recoveries at archaeological sites in the United States.

The growth in Arizona archaeology has paralleled that of the nation. In 1965, the Arizona State Museum issued 77 site numbers.² In the decade from 2001 and 2011, 1,318 new site numbers on average were issued annually, or 18 times the number issued annually before NHPA. There are currently (March 17, 2016) 55,490 sites entered into AZSITE, Arizona's cultural resource inventory system. There also are currently 19,434 projects entered into AZSITE, with between 600 and 700 on average being entered annually².

In my estimation, CRM has done a reasonably good job of finding sites. Because CRM has embraced a policy of "avoidance as the preferred alternative," project sponsors have been forced to alter plans that would otherwise destroy or disturb archaeological sites when possible. And, when it is not possible, we have performed a substantial amount of archaeological excavation and analysis as well as curating collections in perpetuity. On balance, I believe the archaeological community has lived up to its bargain in terms of finding and saving places of value and in striking a reasonable balance between economic development and historic

Table 1. Summary Data from the Federal Archaeology Program (1985–2012)

Year	Number of Field Studies	Annual Acres Surveyed	Annual Sites Recorded	Data Recovery (Projects)	Data Recovery (Sites)	Cumulative Field Studies	Cumulative Acres Surveyed	Cumulative Sites Recorded
1985	14,746	5,370,618	27,717	1,111	2,362	14746	5,370,618	27,717
1986	20,262	7,718,903	35,989	986	-	35,008	13,089,521	63,706
1987	15,915	6,548,994	25,228	1,081	-	50,923	19,638,515	88,934
1988	15,633	3,268,788	25,158	951	-	66,556	22,907,303	114,092
1989	12,641	4,892,677	18,473	911	-	79,197	27,799,980	132,565
1990	15,679	4,506,552	18,642	1,008	-	94,876	32,306,532	151,207
1991	21,111	6,360,255	36,013	620	-	115,987	38,666,787	187,220
1992	19,494	7,421,808	35,518	908	-	135,481	46,088,595	222,738
1993	14,961	4,540,470	35,051	643	-	150,442	50,629,065	257,789
1994	19,446	7,320,964	49,729	786	-	169,888	57,950,029	307,518
1995	15,177	6,877,072	36,376	1,073	-	185,065	64,827,101	343,894
1996	23,765	4,944,156	34,128	1,211	-	208,830	69,771,257	378,022
1997	23,176	5,083,301	35,651	7,411	-	232,006	74,854,558	413,673
1998	19,594	3,408,501	47,309	986	2,777	251,600	78,263,059	460,982
1999	14,320	2,490,857	24,240	531	1,538	265,920	80,753,916	485,222
2000	39,937	4,381,700	31,501	538	3,794	305,857	85,135,616	516,723
2001	43,838	6,290,015	36,004	652	1,410	349,695	91,425,631	552,727
2002	50,263	3,967,810	28,819	810	2,209	399,958	95,123,441	581,546
2003	44,180	5,870,651	28,361	652	2,167	444,138	100,994,092	609,907
2004	54,177	3,561,821	32,657	1,048	2,565	498,315	104,555,913	642,564
2005	58,744	6,781,309	30,620	1,948	2,556	557,059	111,337,222	673,184
2006	57,667	5,327,711	31,429	1,975	3,307	614,726	116,664,933	704,613
2007	50,553	5,026,297	36,448	406	1,064	665,279	121,691,230	741,061
2008	104,853	6,591,752	47,649	518	834	770,132	128,282,982	788,710
2009	20,996	5,483,368	19,560	662	1,385	791,128	133,766,350	808,270
2010	23,031	1,788,515	24,029	621	1,282	814,159	135,554,865	832,299
2011	21,088	3,134,529	31,086	512	2,919	835,247	138,689,394	863,385
2012	16,024	1,354,415	19,864	303	929	851,271	140,043,809	883,249
Standard Deviation	20,640	1,675,002	8,106	1,273	890			
Average	30,403	5,001,565	31,545	1,102	2,069			
Total	851,271	140,043,809	883,249	33,237	36,056			
Compound Annual Growth Rate						15.37%	12.35%	13.16%

preservation.

I am not as sanguine about whether we have met the compact with regard to enlightening the public about the past in ways that benefit society. CRM in the United States is a project-driven enterprise. Each project is independent, even if it is adjacent to or overlaps with another project. Although much is made of ensuring that every archaeological site is evaluated within the proper historic context, in truth, there is very little incentive in CRM to “think big.”

For decades, federal agencies have instructed consultants that they are not to conduct research, only CRM, as though one can do the latter without the former. As early as 1984, Lipe (1985) expressed his dismay over the false, yet insidious, dichotomy:

I am sure that most of you have shared with me the experience of hearing an agency cultural resource manager say (usually rather sheepishly) “My agency does cultural resource management; we don’t do research.” I must confess that I don’t

have the slightest idea what the apparent non sequitur could mean, and I doubt that most individuals who utter it have any clearer idea. How would it be possible to locate archaeological resources and determine their informational value without doing research? And if an agency funds data recovery to mitigate the adverse effects of one of its actions on archaeological resources, how could this possible be accomplished without research? (Underlining by Lipe.)

In my experience, what is usually meant by “we do CRM, not research,” is that the agency is responsible for documenting the investigations and curating the collection, but not for interpreting the results beyond summarizing the data. CRM field and laboratory documentation is generally completed to relatively high standards, and CRM reports are reasonably good at describing methods and results. What passes for interpretation, however, are summary statements about what was found and how the results are consistent or at odds with more-or-less formulaic historic contexts.

The upshot is that CRM has become very good at filling in the dots in regional culture histories. CRM projects tend to be so many data points allowing an increasingly finer understanding of where and when people lived, what they ate, and the materiality of their lives. Understanding deeper aspects of the past, such as why people did what they did, however, is not commonly encouraged or undertaken. Yet, is there any evidence that the American public wants more? I strongly believe the answer is ‘yes,’ even though I am equally convinced that most people do not know it.

The world is beset with a myriad of challenges that appear quite dire and for which there are no clear solutions. Climate change threatens our way of life, if not the continued existence of the human species. War and conflict are ever present. Fights over water and natural resources intensify as the population growth on the planet shows few signs of abating. These issues and others like them dominate public discourse and scientific

research. Yet, archaeology is largely absent from these debates. While paying lip service to heeding the lessons of the past, most of those conducting research or developing policy focus on the immediate: technological solutions to fix a particular issue (e.g., green energy to replace dependency on fossil fuels) or public policy to change behavior (e.g., China’s one-child policy).

Most civilizations have faced similar existential questions and virtually all thought they could outthink the problems through technology or policies. As archaeology and history lay testament, all failed. Archaeology remains the one social science that studies human behavior over time spans long enough to evaluate adaptive strategies in terms of resiliency and sustainability. That the public still views archaeology as an interesting but quaint pursuit designed primarily to shed light on the past, but not a serious science that can shape thinking about the challenges confronting us is not their fault, it is ours. We need to demonstrate that archaeology can speak to issues like adaptation, social inequality, urbanism, and social justice in ways that transform the public debate and ultimately public policies to the problems confronting us today. To do so we need to move beyond narratives of what happened in the past to producing broad statements about how and why humans behave over time and how this information can be of value today. We need, in short, to move from interpretation to synthesis.

SYNTHESIS IN ARCHAEOLOGY

For purposes of this paper, I distinguish interpretation from synthesis by restricting the former to inferences derived from one body of data, whereas synthesis uses multiple bodies of data to infer or explain archaeological phenomena. Thus, one interprets the results from an archaeological site excavation but synthesizes the data from multiple sites into theories about past behavior. Naturally, there is a graduation in synthetic research from “minor” synthesis of just a few data sources to “grand” synthesis in which the theoretical argument is based on hundreds or thousands of data sources. For the most part, I am concerned herein with grand synthesis.

Grand synthesis has a long history in archaeology. Perhaps the best-known archaeological synthesizer was V. Gordon Childe, who between the 1920s and the 1950s was extremely influential writing for both archaeologists and the public. In books like *Man Makes Himself* (Childe 1936) and *What Happened in History* (Childe 1942), as well as in articles, including “The Urban Revolution” (Childe 1950), Childe demonstrated a profound knowledge of published and unpublished literature on topics such as the origins of the city, state, and civilization, and an amazing facility to order disparate data into a new understanding of the subject. Childe, of course, did not write in a vacuum. His most important work took place

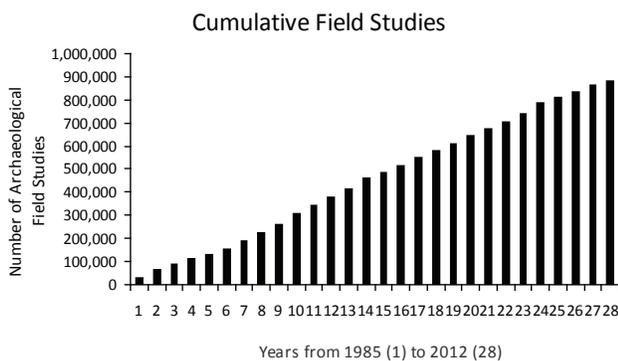


Figure 1. Cumulative Number of Archaeological Field Studies in the United States, 1985–2012

just before, during, and after World War II, a time when modern society had been shaken to its very core. Many people were left wondering how society had gotten to this point and where it was going. An avowed Marxist, Childe argued that human society had advanced through stages of major change, namely the Neolithic revolution, the urban revolution, and the industrial revolution (Trigger 1980). By using Marxist theory, Childe was able to navigate through human history at a time when the archaeological record was poorly known. In a sense, the lack of data allowed Childe to make large inferential leaps connecting far-flung data points in a coherent narrative that made great sense to a large audience of professionals and nonprofessionals alike.

Although grand synthesizers in the tradition of Childe are not common today, they do exist. Two, in particular, highlight the popularity and problems with synthesizing archaeological data. Brian Fagan is perhaps the best-known archaeologist who writes synthetic books based on archaeological data, mostly, but not entirely, for the general public. Beginning his career as a Stone Age archaeologist in Africa, Fagan is now an unabashed generalist, who writes on topics ranging from climate change (Fagan 2000, 2002, 2004, 2008) to tomb robbers (Fagan 1975). He does not claim to be an expert in any one field, but as an archaeologist, he has the ability to comb through lots of reports critically so that his inferences are grounded in interpretations as opposed to a priori theories bolstered with hand-picked sources. Fagan does not synthesize archaeological data as much as synthesize archaeological interpretations about those data. Given the vast numbers of reports being produced, it is hard to see how any individual could do anything else.

In contrast to Fagan stands Jared Diamond. A physiologist and evolutionary biologist by training, Diamond has written a number of extremely popular books on human societies, particularly how the relationship between human groups and the environment affects technology, social organization, and history (Diamond 1997, 2006, 2012). In anthropology, Diamond's work is most closely aligned to cultural ecology; human societies adapt to their natural surroundings through their social organization, ideological beliefs, and technological development and in turn that environment is changed in ways that either enhance or disrupt the indigenous groups, which then recalibrates its adaptation. At times, Diamond borders on environmental determinism in which human agency has little effect on environmental parameters, leading to inevitable societal outcomes.

Diamond's arguments are powerful and persuasive. Much like Childe, he uses a theoretical framework that allows a coherent narrative that explains multiple and disparate decisions by human societies that defy common sense. Unlike Childe, Diamond is not well versed in the archaeological literature. He tends to cherry-pick interpretations that fit his thesis and does not synthesize

archaeological data at all. Personally, I find Diamond's books very interesting until he comes to a region, such as the American Southwest, that I know reasonably well. At that point, it is clear that he is applying one or a few interpretations that fit his argument, but that he does not know the data well enough to be able to evaluate counterarguments or to discern the nuances, complications, or qualifications on which the interpretations are based. Diamond's arguments are logically compelling and he may well be right, but if so, it is not because he has synthesized the archaeological record in any meaningful way.

SYNTHESES OF ARIZONA ARCHAEOLOGY

Although not at the grand scale of Childe, Fagan, or Diamond, Arizona archaeologists also have a long history of trying to put in order and understand events of the past in the state (e.g., Kidder 1924, McGregor 1951). For the purposes of this paper, I have restricted my brief and selected review to the period following the passage of NHPA.

Summarizing Culture History and Exploring Cultural Dynamics: 1966–2000

Shortly after the passage of NHPA, there were two major synthetic studies published on Arizona archaeology. In 1973, Paul Martin and Fred Plog completed *The Archaeology of Arizona* (Martin and Plog 1973), which was followed three years later by Emil Haury's (1976) *The Hohokam, Desert Farmers and Craftsmen: Excavations at Snaketown 1964–1965*. In many ways, these two books are the capstones of archaeological research in Arizona prior to CRM. Martin and Haury were two of the dominant figures in Southwest archaeology from the 1920s into the 1970s. The two books represent the two forms that archaeologists of the pre-CRM generation used to marshal data from archaeological investigations into knowledge about the past. Martin and Plog's work is organized by regions and is largely culture historical in nature. The goal is to provide a linear narrative that places data into temporal and spatial sequences tied to archaeological cultures as defined by a plurality of common traits. Haury's monograph is first and foremost a report on a particular excavation of a critically important site in the Hohokam region, which is then placed in context with other excavations at the site and ultimately incorporated with data from other sites into a comprehensive statement about the Hohokam culture. Synthesis for Martin and Haury is primarily an inductive enterprise, by which data are amassed and categorized into phenomena which are then explained with post hoc explanations. Much like Childe, these syntheses are powerful precisely because they are written by archaeologists who command the literature at a time when the literature could be commanded.

Much of Arizona's land is managed by federal agencies. In the early days of CRM, two of the largest federal land-management agencies in Arizona, the Bureau of Land Management (BLM) and the Forest Service (FS), sponsored cultural resources overviews to provide baseline information on archaeological resources for which they were responsible. The state was divided into five regions. Fred Plog (1981) undertook the overview for northeast Arizona, which focused on the Little Colorado region. Gordon Bronitsky and James Merritt (1986) produced the overview for southeast Arizona, whereas Randall McGuire and Michael Schiffer (1982) led the effort for central and southwest Arizona. Helen Fairley and I were awarded a contract for the northwest part of the state, known as the Arizona Strip (Altschul and Fairley 1989), and Connie Stone wrote three overviews for the west central deserts and the Colorado River drainage (Stone 1986, 1987, 1991).

The overviews were comprehensive, each region requiring several years to compile and write. Conducted at the dawn of the personal computing era, authors traveled to archives and libraries to amass published and unpublished reports and documentation and worked largely as individual scholars to organize and summarize the material. Each overview reflected the interests of the authors, with some focused on culture history, others on methodology, and still others on theory. Many of the overviews are still cited, which is indicative of their quality and the commitment of the BLM and FS at that time to publish and disseminate CRM work. Although CRM overviews are still being produced in Arizona, they cover much smaller areas than the original BLM/FS overviews—a realistic response to an ever increasing number of reports and data—and very few are published.

In the 1990s, the Arizona State Historic Preservation Office (SHPO) sponsored a series of thematic historic contexts, some of which focused on archaeological topics. Archaeological contexts included studies of trails (Stein 1994), rock art (Thiel 1995), water utilization (Foster et al. 2002), Paleoindian and Archaic sites (Mabry 1998), and the prehistoric to historic transition period (Gilpin and Phillips 1998). Thoroughly researched, the contexts were designed to help in the evaluation of the eligibility of archaeological sites for listing in the National Register of Historic Places. Perhaps due to their compliance orientation, the contexts were never heavily utilized outside of CRM; none were published, and academics generally ignored them.

Providing Arizona with water has led to some of the largest archaeological projects in the state. Under the umbrella of the Central Arizona Project (CAP), water-related projects administered by the Bureau of Reclamation (BOR) have included transporting water through an extensive canal system from the Colorado River to much of the state, increasing the size of reservoirs, and developing irrigation and water control systems for affected Native American tribes and communities. As part of CAP activities, the BOR sponsored numerous archaeological proj-

ects, which together involved the survey of thousands of acres, the excavation of hundreds of sites, and the production of scores of reports (Whittlesey 2003; see also <http://core.tdar.org/collection/17730/central-arizona-project>, accessed March 17, 2016).

Most BOR sponsored archaeological projects were treated as stand-alone investigations, wherein a specific reach of a canal system, for example, was surveyed and the discovered resources evaluated through test excavations, treated through avoidance or data recovery, and all work documented and the results interpreted in one or a related set of reports. Research direction was dictated by the sites in the project area, an inductive practice pervading CRM. The Roosevelt Archaeological Project, in contrast, flipped this dynamic on its head. The BOR, in consultation with the Tonto National Forest, defined three complimentary, yet independent, problem-oriented research projects. Sites to be investigated were selected not by their propinquity but by their research potential (Dean 2000:xvi, Pedrick 1992:1, Rice and Lincoln 1998). The three studies were staged to build on each other, with the final report being a synthetic statement on Tonto Basin prehistory (Rice 1998).

In addition to technical reports on specific projects, the BOR sponsored two edited volumes (Dean 2000; Gummerman 1991) along with a popular volume summarizing CAP archaeology (Whittlesey 2003). Both edited volumes were the result of Amerind Foundation seminars, which adopted a largely academic forum to explore CRM results. CRM participants in the major CAP projects were joined by academic researchers to discuss the results and then develop these ideas into chapters in a published volume edited by a leading Southwest archaeologist. The resulting volumes are extremely impressive interpretations of a massive amount of archaeology. Yet, they do not work as syntheses in the sense that the whole is no more than the sum of its parts. One has the sense that the hill—the scores of reports and the enormous amount of data—is simply too hard to climb, and that individual authors are struggling mightily to make sense of the topics assigned to them to say nothing of the larger subject. This criticism is not to diminish the importance of these works. They remain widely cited and some of the best statements on Hohokam and Salado archaeology. No other agency supported similar attempts to make sense of the archaeology they funded. The BOR remains the gold standard in Arizona CRM.

Although the sponsors of archaeological synthesis in Arizona between 1966 and 2000 changed, the form that synthesis took did not. Synthesis remained a largely individualistic pursuit. Emerging from the academic foundation of Martin and Haury, early CRM overviews relied heavily on individuals to perform them. The BOR-sponsored Amerind Foundation seminars attempted to break this approach with mixed results. They certainly contain more voices, but the individual contributions remain just that, individual.

CRM Experiments in Synthesis: 2000–2016

Since 2000, synthetic research of Arizona archaeology has been limited and sporadic. In large part, this trend reflects a nationwide trend, aggressively advanced by the administration of George W. Bush, to restrict federal archaeology programs to a narrow reading of the laws and regulations affecting historic and cultural resources. The saying, “we do CRM, not research” (see above) seemed to make a subtle switch to “we do compliance, not research,” during the first decade of the 21st century with the perhaps not-so-unintended consequence that federally sponsored synthetic studies became almost non-existent in Arizona. In this political climate, individual and small teams of archaeologists did their best to pick up the slack (e.g., Abbott 2003, Lekson 2008, Mitchell and Brunson-Hadley 2001, Rice 2016). But it fell to CRM companies and preservation minded organizations to fill the vacuum left by federal and state agencies. In Arizona, two CRM-based institutions, Desert Archaeology, Inc. (DAI), and its allied not-for-profit, Archaeology Southwest (formerly, the Center for Desert Archaeology [CDA]), and Statistical Research, Inc. (SRI), ventured into synthetic research in very different ways.

Similar to the BOR approach, DAI and CDA sponsored a regional synthetic effort for southwestern New Mexico and southeastern Arizona. In 1997, DAI/CDA convened an Amerind Foundation seminar during which archaeologists who had been active in CRM and academic projects were given regional and/or topical subjects to synthesize. Draft reports were presented to other participants, and based on the discussions, each topic was refined into a chapter in a published volume (Wallace 2014).

CDA followed up the Amerind seminar with another one at the Museum of Northern Arizona (MNA) in 2001. Unlike previous attempts, the MNA seminar was focused not on a region, but on a particular problem, the origin of the Zuni language and culture. A group of archaeologists, linguists, historians, and Native Americans were invited to the seminar. Each was given a particular topic, with the goal to reach a synthetic statement about Southwestern archaeology (Gregory and Wilcox 2010). The edited volume examines lots of data, some of which was generated by CRM projects, but, like the earlier Amerind volume, it is decidedly not about CRM.

In contrast, SRI sponsored a volume on the archaeology of the Western Papaguería (Altschul and Rankin 2008), which is decidedly about CRM. SRI invited and subsidized archaeologists, geoscientists, historians, and Native Americans to contribute to a volume on the archaeology of a region known largely through CRM projects. By design, the book was eclectic. There was no attempt to meet and discuss contributions. Instead, the editors wanted archaeologists who had led CRM projects and Native Americans who participated in those projects—two groups who otherwise would not generally publish outside of CRM’s gray literature—to be val-

ued for their work by making it more accessible to the profession and the wider public. Adrienne Rankin and I encouraged authors to integrate multiple projects and multiple data sources (e.g., combine archaeology and oral history), but otherwise trusted that authors who had many projects and many years of pent up things to say would produce synthetic statements (admittedly with mixed results).

These three CRM synthetic attempts highlight the lack of models available to CRM-based groups doing synthesis. DAI/CDA follow a more traditional academic seminar approach by which leading experts in a field amass to study a particular aspect of archaeology and are assigned specific topics impinging on the research question; the editor(s) or his/her designee are then responsible for pulling together the common threads. SRI took a very different approach, which was focused on inclusiveness, with little concern for a coherent narrative. What the three efforts described above have in common is a determined effort to show that CRM is more than compliance and that those who practice CRM have much to say about the past if given the chance.

Academic Synthetic Research in Southwest Archaeology: 2000–2016

In the last decade, academic research has shifted from a focus on individual projects to synthetic work. This shift is due in large part to a convergence of three forces. First, there is the wave of new data from CRM that is constantly being added but not completely interpreted to say nothing of synthesized. Second, there is the recognition that academic field projects in the Southwest are becoming more difficult to conduct and of lesser importance. If field projects are on public land, researchers have to convince descendant communities, who are often opposed to archaeological research, that disturbing a site that would otherwise not be disturbed is in their best interests. Even if successful, funding for field projects is limited. The resulting projects are relatively small and unless placed in a region where development is precluded, they are of limited scientific value, essentially another piece in the regional sequence. Third, NSF funding for senior archaeological research grants in the archaeology program has essentially stayed the same or actually fallen behind inflation over the last decade. The current average NSF archaeology program senior grant is \$161,000 (http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=11690, accessed March 17, 2016), whereas a modest sized CRM data recovery in Arizona can easily be two or three times this amount. Given the relatively small size of grants awarded by the NSF’s archaeology program, archaeologists have been drawn to NSF’s better funded interdisciplinary competitions. Because archaeology is interdisciplinary by nature, working on scientific problems that incorporate multiple data sources with ecologists, geoscientists, material culture experts, anthropologists, historians, and

computer scientists comes quite naturally to archaeologists. The shift toward synthetic work in the last few years is driven in part by interest to work on big questions but is also a reflection of self-interest driven by the changing economics of science.

Since 2000, at least three NSF-funded projects integrate CRM data from the American Southwest in synthetic interdisciplinary projects. The Long-Term Vulnerability and Transformation Project (LTVTP) focuses on five archaeological case studies, of which four are in the American Southwest, to study the resilience of societies in the face of major social and environmental change (Hegmon et al. 2016; Nelson et al. 2016). While anchored in archaeology, LTVTP incorporates the disciplines of mathematical modeling, ecology, and institutional analysis (<http://ltvtp.shesc.asu.edu/index.html>, accessed March 29, 2016).

A second synthetic study is the Village Ecodynamics Project (VEP) (Kohler and Reese 2014), which began in 2002. Focused on southwestern Colorado, VEP is a collaborative project among a variety of institutions led by Washington State University that focuses on modeling the interactions between humans and their environment to better understand how small-scale agrarian societies adapt to their natural surroundings. In 2009, VEP entered a new phase of research, moving its focus from households to groups and expanding its geographic range to incorporate the larger Mesa Verde region, including the northern Rio Grande area of New Mexico. VEP has led to the development of a variety of tools critical for archaeological synthetic work that extend well beyond the American Southwest. For example, an allied NSF-funded project, Synthesized Knowledge of Past Environments (SKOPE), is developing cybertools for synthesis (<http://www.envirecon.org/>, accessed March 29, 2016 and <https://core.tdar.org/document/396677/toward-effective-cyber-infrastructure-support-of-socio-environmental-research>, accessed March 29, 2016).). Another product of VEP is a dataset containing over 32,000 tree-ring dates from states in the American Southwest (<https://core.tdar.org/dataset/399315/compiled-tree-ring-dates-from-the-southwestern-united-states-unrestricted>, accessed March 29, 2016).

The Southwest Social Networks (SWSN) project began in 2008 to explore regional networks and interaction in the western American Southwest for the period between a.d. 1200 and 1500 (Mills et al. 2013). Led by the University of Arizona and Archaeology Southwest, SWSN combines archaeology, geochemistry, sociology, and computer science to examine the archaeological record from thousands of sites, most of which were recorded as part of CRM projects. One important lesson of the SWSN is that transforming CRM results into usable data for academic research, while possible, is extremely costly and time consuming.

The recent NSF synthetic projects are a welcome addition to a Southwest archaeology currently domi-

nated by CRM projects that are culture historical by nature. Although structurally quite different, the synthetic projects share two attributes of CRM projects that to my mind holds back American archaeology; they are not coordinated in any meaningful way toward a common goal, and each is independently funded. The latter in particular works against the long-term success of synthetic research. Whereas CRM is fixed in law and regulated to a particular end—the discovery and documentation of the archaeological record—academic research by nature is fluid. The current interest in synthesis may represent a long-term trend in archaeology, but it is just as likely to be a function of the priorities of academic research funding, which can and do change over time. To ensure that synthesis remains viable, archaeologists need to make the case that compliance is more than documentation and that there is no compliance without research. But it is not just that we need to conduct research, we need to conduct research on the right questions; the ones that the public is interested in and whose outcomes will affect their lives. But what are those questions? What are the grand challenges of archaeology?

The Grand Challenges of Archaeology

In 2012, NSF sponsored a project to identify investments in information technology infrastructure (i.e., cyberinfrastructure) which would allow archaeologists to address the most compelling scientific questions facing the discipline (Kintigh et al. 2014a:6). A steering committee led by Keith Kintigh of Arizona State University divided the project into two tasks. The first task involved the development of a list of the most important scientific challenges facing archaeology in the early part of the twenty-first century. Once these “grand challenges” were identified, the second task consisted of identifying the technology and attendant social structures and dynamics needed to address them.

The project began by inviting the archaeological community to participate through a crowdsourcing exercise to identify the grand challenges of archaeology. A group of scholars was then convened to compile the crowdsourced answers, add some of their own, and integrate the results into a list of 25 grand challenges (Kintigh et al. 2014a, 2014b). The challenges, which focused on the dynamics of cultural processes and the coupled relationships between humans and their social and natural environments, were divided among the following five themes:

- Emergence, communities, and complexity
- Resilience, persistence, transformation, and collapse
- Movement, mobility, and migration
- Cognition, behavior, and identity
- Human-environment interactions

The goal of the exercise was not simply to list the most interesting questions facing archaeology, but to

phrase them in a way that they could be answered in the next 25 years if the discipline was provided the needed support. What that support might consist of was the subject of the second stage of the grand challenge project. A second panel of archaeologists, computer scientists, and experts who study the scientific process was assembled to examine the impediments to conducting archaeological synthetic research (Kintigh et al. 2015:4). They identified the five following areas:

- *Data Preservation.* Archaeology has a long tradition of curating physical remains, but disciplinary norms are only beginning to be developed with regards to digital data. In the last few decades, archaeologists have noted that reports, maps, figures, analytical databases, photographs, and so forth that have been produced digitally are becoming increasingly difficult, if not impossible, to use because they are not being migrated or the storage media (e.g., DVD) are not designed for long-term data preservation.
- *Discovery and Access.* Even if reports and supporting materials exist and can be read, finding reports and data is no simple task. Prior to the NHPA and other laws, most archaeological investigations ended in a published monograph or journal article. Because there were a relatively small number of publication outlets in archaeology, discovering new and old literature on a subject or region was not difficult. Today, most reports are not published. They may be available through the SHPO/THPO or the state/tribal designated repository, but in many cases only project sponsors have copies, and these groups generally do not have an interest in long-term preservation of the results nor their widespread dissemination. Even when these sources are published, the advent of on-line publication has made it difficult to track new finds and interpretations.
- *Data Integration.* Archaeological research requires the categorization of observations along dimensions of time, space, and materiality. Different archaeologists can observe the same object or phenomenon and call it by different terms. Pottery and projectile point typologies are perhaps the best-known example of different terms being used for the same artifacts. Terms such as village, hamlet, and activity area, which refer to more abstract concepts, are even more diffuse and less standardized. Archaeological classes often do not have explicit defining criteria, which makes it incredibly difficult to merge results from different investigations.
- *Data Complexity.* Archaeological synthesis requires integrating data recorded at scales ranging from microscopic to global. Generally,

archaeologists conducting synthetic research do not utilize raw data from individual investigations, but rather use the interpretations or data summaries provided in various reports to examine a higher level theoretical or regional question. Instead of combining data sets to formulate a new understanding in a true synthesis, this type of research is better viewed as summarizing the summaries of investigations to reach a new understanding that is bigger than, but fundamentally the same as, the subjects of the original studies.

- *Data to Information to Knowledge.* Archaeological synthesis requires more than simply manipulating lots of data from various sources to study a particular issue. Indeed, the opposite is more the case: one starts with a problem, decides what variables impinge on the subject, and then manipulates observations from various data sources into proxies of those theoretical variables. Archaeological synthesis generally involves a long inferential chain, which is often implicit, and even when explicitly stated, the logical chain is subject to debate.

The impediments to archaeological synthesis cited above have technological and sociological elements. Issues related to ontology and language, for example, may be aided by advances in computer science. Solving problems with data preservation, discovery, and access also may have technological elements, but will also require disciplinary changes, such as normative emphasis on data archiving, if not statutory requirements. To overcome these impediments, we need to do our own research on how archaeologists actually do synthetic work.

LONE SCHOLAR TO SYNTHESIS CENTERS

As recounted above, synthesis in archaeology has traditionally been a lone scholar pursuit. Individuals take on the herculean task of compiling, integrating, and synthesizing the results from a region. What varies is not the nature of the enterprise, but the scale and scope of the task. Whereas Childe took on all of Europe and the Near East, Martin and Plog restricted their sights to Arizona, and the authors of the BLM/FS overviews focused on sub regions of that state. When done well, these syntheses are very powerful. In the hands of someone who does not command the literature, the results may be popular with the public, but generally lack the strength to move the discipline forward.

Yet the basic problem facing archaeology today is that the lone scholar approach is simply no longer tenable. There are too many data, in too many places, in too many forms for lone scholars to conduct credible synthetic research. What is needed is an institutional approach

to synthesis; one that fundamentally transforms the discipline from individual scholarly agents to interdisciplinary research teams. Archaeologists may counter that they have been working in teams for decades. This assertion is true for the production of archaeological data; it is not true for the creation of archaeological synthesis.

Fortunately, archaeology is not the only science facing this problem. In the early 1990s, ecology went through a similar transformation (see Hackett et al. 2008). In the late 1980s, ecological professional associations began lobbying NSF for a center where synthetic work could be conducted. In a joint paper, the Ecological Society of America and the Association of Ecosystem Research Centers in 1993 (quoted in Hackett et al 2008: 280) argued that, "Synthesis is needed to advance basic science, organize ecological information for decision makers concerned with pressing national issues, and make cost-effective use of the nation's extant and accumulating database." The result was the creation in 1995 of the National Center for Ecological Analysis and Synthesis (NCEAS) in Santa Barbara, California. In the intervening 20 years, NCEAS has emerged as one of the leading institutions in the study of ecology and the environment (Hackett and Parker 2015a, 2015b; Hackett et al. 2008).

For NCEAS to work, ecologists first had to change the way they thought about research. As Hackett et al. (2008:281) explain:

The research performed at NCEAS differs in several ways from the traditional field-based science of ecology. Most studies in ecology have concentrated on small spatial and temporal scales, while the focus at NCEAS is larger scale, often analyzing data covering substantial swaths of time and space. Where traditional empirical work in ecology involves hands-on spells of fieldwork, NCEAS scientists are frequently unfamiliar with the study sites from which their data were gathered. Advanced statistical and mathematical modeling techniques replace transects and trips to the field.

In practice, synthetic work at NCEAS is done by working groups of between 6 and 20 individuals who convene at the center for intense face-to-face meetings lasting several days. The groups are diverse in composition, representing all sciences and technologies needed to address one or more specific high-level questions. They meet, often in different configurations, several times over two to three years and then disperse to their home institutions, where they continue research on different aspects of the problem. The group's collaborative effort is designed to rapidly advance knowledge on a significant environmental challenge and not to become a permanent working group.

Could something like NCEAS be successful in archaeology? I believe so. But it will take more than bricks and mortar to create a center for synthetic research; it will require disciplinary changes that may take years. At a minimum, these changes include (see also Kintigh et al. 2015:10):

- *Bring Big Data to archaeology:* Archaeologists are adept at adopting the newest technologies to advance fieldwork and analysis. Most of these advances, however, have been relatively low cost. Rarely has the discipline, through its professional societies, successfully lobbied for discipline-wide investments. Yet, synthetic research requires the ability to access and manipulate large data sets, which in turn require large investments in cyberinfrastructure. It will be self-defeating if individual universities and institutions try to create such an infrastructure as opposed to a centralized, major investment at the discipline level.
- *Changing the social dynamics.* Archaeologists often work in groups, but rarely do group members work as a team. While group members may have common goals, each member has a distinct task that is largely independent of other members. It is up to the project leader(s) to incorporate all the results. Traditionally, this dynamic also has been in place for synthetic research. Advanced seminar participants, for example, each develop their work independently. It is then evaluated by the seminar leaders in a synthesis of the syntheses. Perhaps the biggest transformation that took place at NCEAS was changing this dynamic so that research is participatory, not individualistic.
- *To do science, we must first create the conditions under which science can be done successfully.* One of the major findings of NCEAS is that place matters. To establish the social dynamics that led to teams, we first need a place that is conducive to scholars seeing each other as collaborators and not competitors. Archaeology, whether academic research or CRM, is a competitive endeavor in which ideas are held close to the vest. This process may work well for a single project but does not lead to transformative synthesis which requires multiple data sources, high-powered data processing and complex modeling, and adequate time to evaluate, refine, and agree on the results and their meaning. Above all, synthesis requires trust, and that requires individual scholars to open up completely to each other. NCEAS found that trust is best formed in face-to-face groups in settings where scholars see themselves as equals. It requires a safe place on neutral ground.
- *Archaeology does not take place in a vacuum.* Most archaeology today takes place as part of CRM projects. By definition, CRM is a negotiated process among stakeholders in which archaeological resources are balanced against public and private development interests. The results are often colored by the politics of the development;

who is for it and who is against it, and most of all, who is paying. But it not simply that archaeology is fought over on a project-by-project basis. The public expects something in return for their support. The problem, however, is that the public does not speak in one voice. Different groups value different aspects of the past, and use that past to justify, defend, or promote political and cultural objectives (Lowenthal 2015). Descendant communities may want their ancestral sites saved; intellectuals may want their history explained; spiritualists may want to feel their lives connected to the past. The science of archaeology is influenced by these pressures, and CRM archaeologists, whether consultants or government agents, tend not to draw their interpretations too broadly. But CRM can be flexible in designing solutions that honors varying public interests and advancing societal needs for scientific answers to pressing questions of our day (Sebastian and Lipe 2010). In this vein, synthesis cannot solely be an academic enterprise, and the incorporation of CRM archaeologists and other interested parties must be accommodated.

Archaeologists are best served to recognize that there are many types of synthetic research; each requiring different approaches and expertise, but all requiring the ability to integrate large data sets, teamwork, and a place devoted to synthetic research. We need to move from the isolated offices of lone scholars to a central place where groups of scholars can coalesce and interact in new ways, leading to transformative ways to know and understand the past.

RISING TIDE OR TSUNAMI: THE EFFECT OF NHPA ON AMERICAN ARCHAEOLOGY AND THE CHALLENGE FOR THE FUTURE

In contrast to the grand syntheses of Childe, American archaeology today has retreated to at most the production of minor syntheses and primarily to the interpretation of project results. In a sense, this outcome was inevitable; we have become the victims of our own success. We simply cannot read the reports, much less synthesize the data of hundreds of thousands of recorded sites and tens of thousands of archaeological excavations. When I was awarded my doctorate in 1982, I considered myself a Southwest archaeologist, meaning I could knowledgeably teach or work in the entire region. Today, a newly minted Ph.D. would more likely describe him- or herself as a Hohokam archaeologist, or even more precisely, a Phoenix Basin Hohokam archaeologist than as a Southwestern archaeologist, and even then, such a person would command only a fraction of the archaeological literature from the Phoenix Basin.

With limited time and resources allocated to interpretation in CRM project budgets, it is not surprising that there is a tendency to “think small.” Project field results are compared to results from an ever smaller circle of nearby projects. There is also a “silo effect,” in which CRM companies tend to cite their own work, not necessarily to be self-serving, but because those are the data they command the best and can easily retrieve. Even among academic archaeologists, regional syntheses are becoming more difficult to write. The Contemporary Perspectives series from the SAA Press, the book-publishing unit of the SAA, was established to disseminate up-to-date regional summaries. To date, four such summaries have been produced (Anderson and Sassaman 2012; Arnold and Walsh 2010; Bayman and Dye 2013; Moss 2011), but others have languished in part because the task of amassing and then summarizing (to say nothing of synthesizing) these data has proven overwhelming.

The next 25 years promises new and exciting archaeological discoveries in the American Southwest. Each year we will learn more about the transition to agriculture, the peopling of the region, the rise and fall of complex social systems, and what happened at the end of prehistory. For many archaeologists, the pieces will be fit into larger cultural sequences as though Southwest archaeology is a jigsaw puzzle to be solved. But the jigsaw analogy only goes so far. No matter how many pieces are found, the story will be incomplete, because finding meaning in how people existed in the past is more than simply knowing what happened in the past. We also need to view past events through the lenses of people’s lives today. The challenges confronting humans in the form of climate change, resource depletion, population growth, urbanization, disease, war, and so on are stated anew by each generation. For the most part, archaeology has been absent from debates about how to confront these challenges and as such decisions tend to be shortsighted and lack any significant time depth. Entering these debates requires forwarding logical arguments about how humans behave in ways that heretofore could not be tested in any meaningful manner. The rapid advance of technology combined with the wealth of data provided by CRM holds the potential for changing the dynamic for studying long-term culture change in fundamental ways. Standing in our way are our own traditions and customs as archaeologists. To break forward, we need to change everything: how we collect, manage, and manipulate data; how we come together to interpret those data; and how we communicate our results with the various publics that support us.

I often hear that the greatest threats to American archaeology in the next 25 years are changes in the legal framework supporting CRM. I agree that change is coming, and not all of it will be welcome by archaeologists. However, I do not believe that changes in the law or the practice of CRM are the major threats to American archaeology. In contrast, I strongly believe that the great-

est threat is that nothing changes; that the status quo of project-by-project compliance continues unabated; that archaeologists mistake increases in data points for increases in knowledge; and that we measure success by the discovery of the new and exotic and not by our inability to engage in public debates about the future.

Change also offers opportunity. NHPA compliance has become a heavily regulated, bureaucratized process. It often feels as though the completion of the process is the goal as opposed to achieving the right preservation outcome. But such is not the case. The goal is to better society, and to meet that goal, American archaeology needs to reassert that synthesis can no longer be viewed as something apart from compliance. To make this assertion resonate with the public, we must focus on questions of importance in ways that do more than explicate the past but marshal understanding of the past in ways that seek to solve today's problems and advance the prospects of our society for the future. To do so, we need to transform how we do our work and how we interact with each other. We need a national archaeological synthesis center.

Notes

1. I have made one entry in my table that differs from the numbers reported in the SRC. In the SRC report for 2007, the US Forest Service reported surveying 1,411,959,265 acres. This number is clearly in error. After raising the issue with the Federal Preservation Officer, Michael Kaczor, the Forest Service recalculated the total acres surveyed by the agency in 2007 and revised the SRC data report to 522,812 acres.
2. All data on ASM and AZSITE was supplied by Teresa Gregory, Administrator, Geographic Information Database, AZSITE and Archaeological Records Office, Arizona State Museum.

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