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

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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 facilitated 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
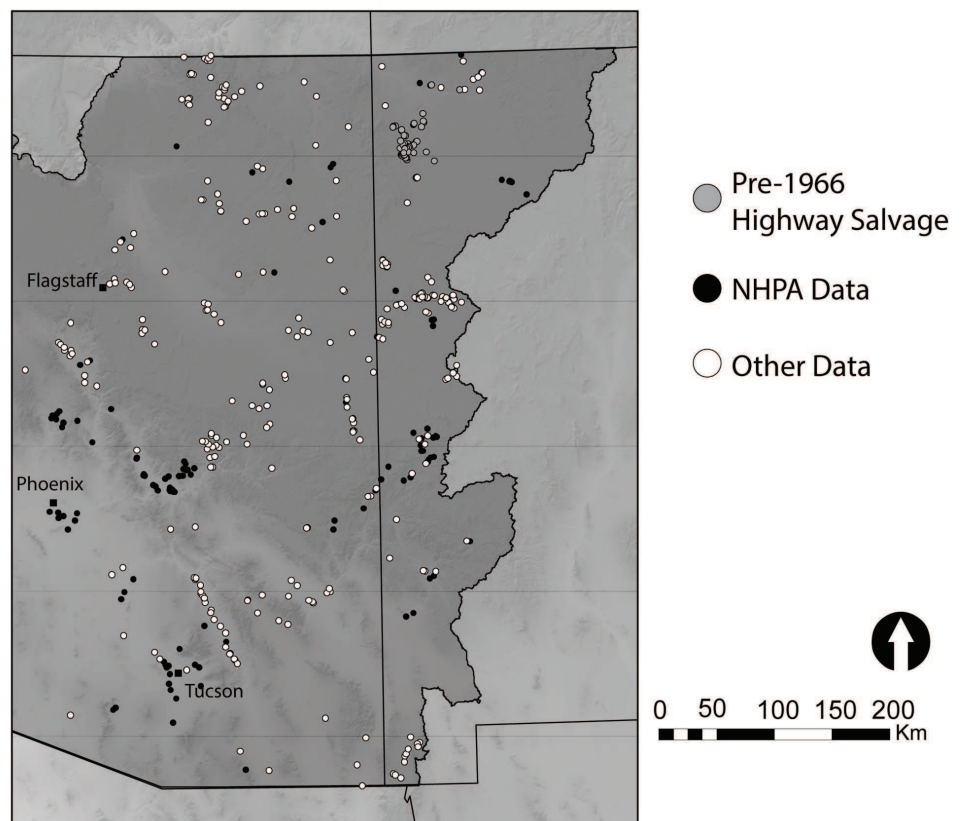

Figure 1. Map of the Southwest Social Networks project area showing all sites with ceramic data, color coded to highlight those data generated through NHPA and Highway Salvage related work.

Full SWSN Database   ·   No NHPA Data

AD 1250-1300
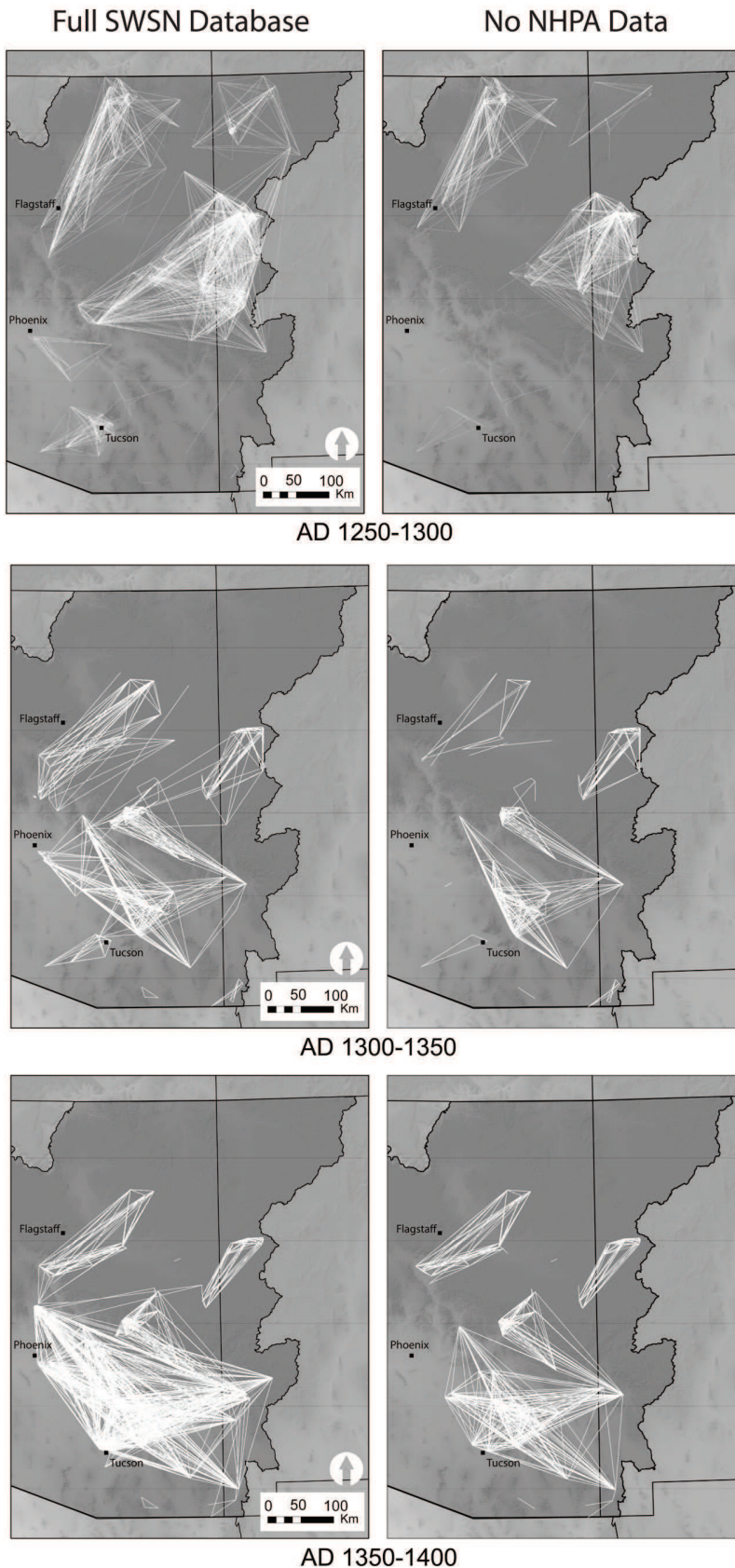
AD 1300-1350

AD 1350-1400

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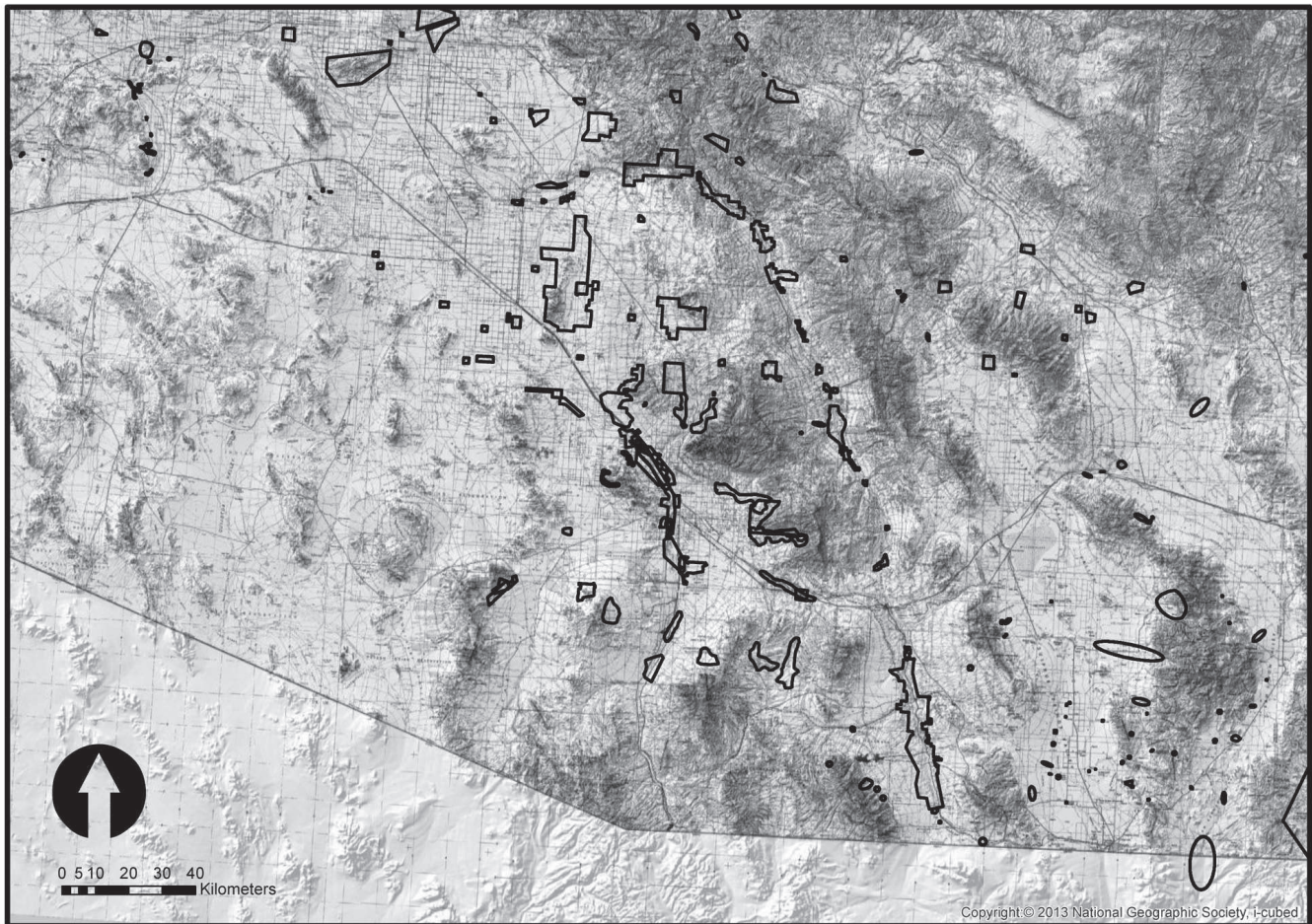
Figure 3. The current distribution of archaeological priority areas (outlined in black) defined by Archaeology Southwest for southern Arizona.

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-

chaeological 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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