The Permian Basin Programmatic Agreement after Seven Years of Implementation

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The Permian Basin Programmatic Agreement is a mitigation program focused on the Mescalero Plain of southeastern New Mexico (Figure 1). The program, which began under a Memorandum of Agreement among the New Mexico Bureau of Land Management (BLM), the New Mexico Historic Preservation Office (SHPO), the Advisory Council on Historic Preservation (ACHP), the New Mexico Archaeological Council (NMAC), the New Mexico Oil and Gas Association (NMOGA), and the Independent Petroleum Association of New Mexico, is an alternative mitigation process that is intended to resolve the adverse effects of full-field oil and gas development. The program, with its emphasis on a peer-driven regional research design and closely coordinated and tightly targeted field studies, has now been in operation for more than seven years. It was extended for three years in 2013 as a Programmatic Agreement, and we anticipate that the program will be extended again before

ABSTRACT

The Permian Basin Programmatic Agreement (PA) is an alternative form of Section 106 compliance offered mainly to the oil and gas industry in southeastern New Mexico for projects located on Bureau of Land Management (BLM) land. Proponents of projects within the PA area may contribute to a dedicated archaeological research fund in lieu of contracting for project specific archaeological surveys, provided their proposed projects avoid recorded archaeological sites. Dedicated funding goes toward research on the archaeology and history of southeastern New Mexico. The PA calls for the consulting parties to evaluate its effectiveness during its seventh year of implementation. As a result of that recent evaluation in May 2015, the PA will be extended for 10 additional years. We discuss the reasons for the PA, successes and missteps during its first seven years, and ways that the Permian Basin PA might be used as a model elsewhere.

El Acuerdo Programático (PA) de la Cuenca Permian es una forma alternativa del cumplimento de normas de la Sección 106 que se ofrece principalmente a la industria del petróleo y gas en el sureste de Nuevo México para los proyectos localizados dentro de los terrenos de la Oficina de Administración de Tierras (Bureau of Land Management). Defensores de los proyectos dentro del área PA podrían contribuir a un fondo dedicado a la investigación arqueológica en lugar de contratar personal para realizar recorridos arqueológicos de proyectos específicos, mientras que estos proyectos eviten sitios arqueológicos ya registrados. Esta financiación se dirige hacia la investigación arqueológica e histórica del sureste de Nuevo México. El PA hace un llamado a las partes consultoras para evaluar su efectividad durante su séptimo año de implementación. Como resultado de esta reciente evaluación en Mayo del 2015, el PA se extenderá diez años adicionales. Discutimos las razones del PA, sus éxitos y tropiezos durante sus primeros siete años y las maneras en las que el PA de la Cuenca Permian podría ser utilizado como modelo en otros lugares.

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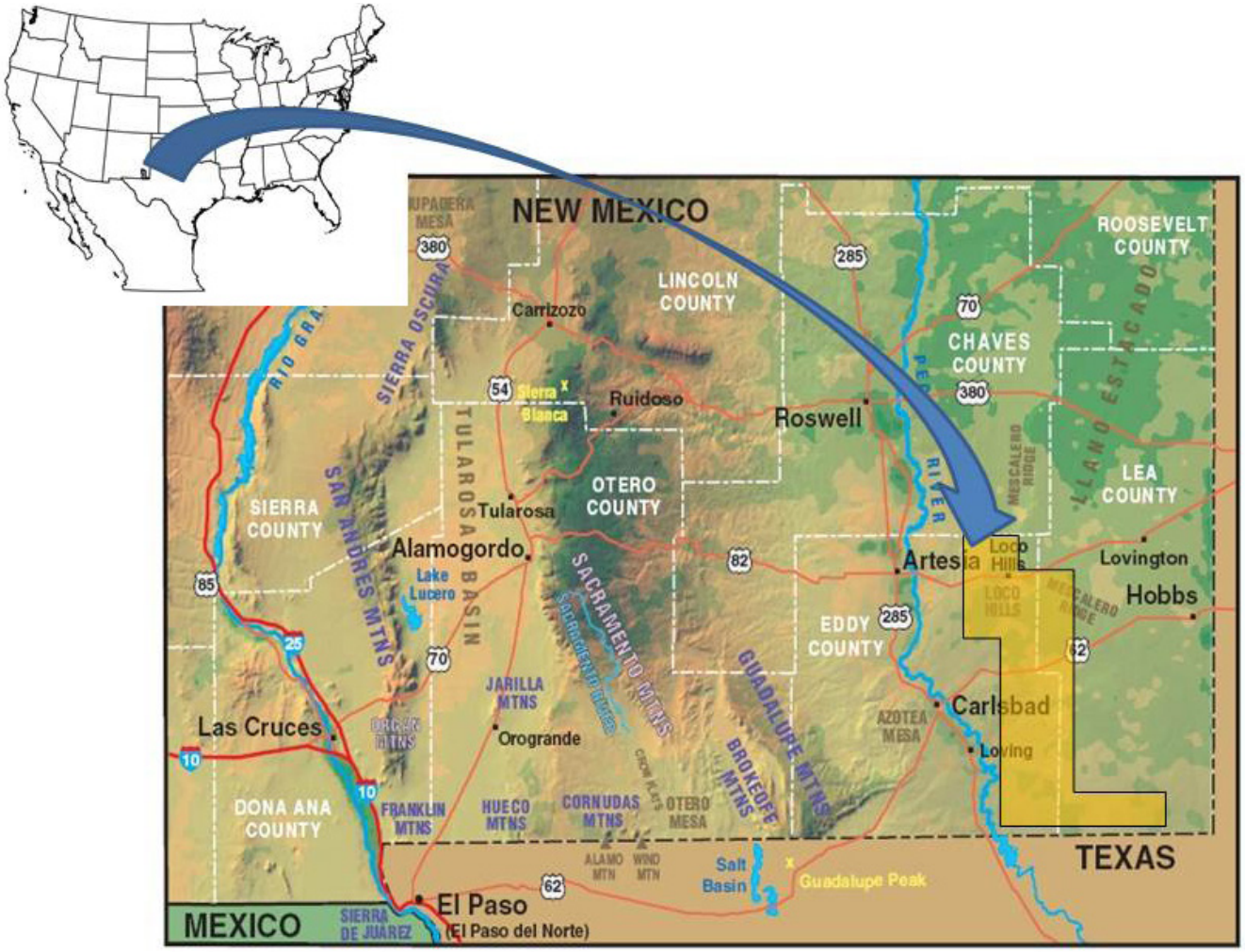

FIGURE 1. Location of Permian Basin PA Area in southeastern New Mexico.

the current Programmatic Agreement expires in May 2016. Here, we review the development of the program and its major accomplishments. We examine how well the program has met its original goals and how well it has addressed not only the initial concerns about this innovative approach, but also a number of concerns that have emerged over the past seven years. We conclude with some suggestions to consider in developing a similar program to meet archaeological research interests, regulatory compliance needs, and industry concerns elsewhere.

DEVELOPING THE PERMIAN BASIN APPROACH

The questions driving the development of the Permian Basin Programmatic Agreement (PA) were broad in scope. Chief among them were: How do you change from a reactive, project-by-project approach to a more comprehensive and proactive approach? How do you initiate a new program when all your resources are directed toward keeping up with the tremendous workload of the current program? How do you integrate cultural resource management, research, and energy development? How do you best serve the public interest in archaeological resources?

For over 30 years, from the early days of Section 106 compliance, the archaeological program in the BLM New Mexico's Carlsbad Field Office was driven by industry's needs, as such programs usually are on the public lands. Where archaeological sites were found to be at risk from any particular proposed development, the preferred action was to "flag and avoid" the sites in the

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project area that were deemed eligible for listing on the National Register of Historic Places (NRHP) as well as "potentially" eligible sites and even those with undetermined eligibility. The focus was on short-term goals: surveying, locating and recording sites, and redesigning projects to avoid as many of the sites as possible. By 2003, over 121,000 ha (300,000 acres)of the 809,371 ha (2 million acres) managed by the Field Office had been surveyed—but in the form of thousands of small well-pad, access road, pipeline, and utility corridor surveys. Fifteen percent of the entire field office surface area had been surveyed and over 8,000 archaeological sites recorded (Schlanger et al. 2013).

Most of the archaeological effort was channeled into conducting small-scale surveys of 16 ha (40 acres) or less. Continued exploration for oil and gas reserves provided occasional opportunities to carry out larger-scale surveys sometimes covering thousands of acres, mainly in the form of large seismic projects with systematic but widely spaced transects. Although there was a high volume of projects for energy companies, those projects were densely clustered in areas most likely to produce oil, gas, and other commodities—not areas that would inform us about the full range of human adaptation. This distribution of projects resulted in a knowledge base that was heavily biased towards the archaeology of the sand sheets of the Mescalero Plain, whereas the archaeology of other areas in southeastern New Mexico remained largely unknown. Data recovery efforts focused on sites that could not be avoided. More often than not, these were smaller, sometimes damaged sites that barely met eligibility criteria for listing on the NRHP.

The archaeologists carrying out the well-pad surveys and small test excavations were becoming very familiar with the fire-cracked rock and artifact scatters of the Mescalero Plain. Very little subsurface testing was actually conducted; instead, most of these scatters were simply assumed to be eligible for NRHP listing on the basis of previous SHPO consultation regarding these scatters. The BLM and SHPO were also becoming familiar with the results of the surveys. Everyone was becoming impatient with the process. The oil and gas industry in particular was fond of pointing out that we seemed to be doing the same thing over and over. We surveyed the same places repeatedly, we recorded what appeared to be the same kinds of sites, and we avoided all the eligible sites we could see on the ground surface.

By the early 2000s, it was becoming very difficult to "fit" development projects between known site locations. Although the practice of "flag and avoid" was partly responsible for the crowding of sites and projects on the landscape, another important factor is the character of the archaeological record in southeastern New Mexico. Thousands of years of occupation mainly by mobile hunter-gatherers created an archaeological record marked by a relatively continuous firecracked rock and artifact scatter punctuated by just a few unusually large campsites and villages. When archaeologists working on the Mescalero Plain used field methods more appropriate for regions where sites are larger and more easily distinguished from a continuous scatter, the result was a noisy clutter of small, unimpressive sites located in a tangle of small surveys. In addition, the presence of sand sheets and dunes led to further complications with defining sites, since "sites" often consisted of the artifacts that were visible on any given day. Similar problems are characteristic of other parts of southern New Mexico, and researchers have been working for the past two decades to address these problems in different ways, particularly at the Fort Bliss Military Reservation near El Paso, Texas (Fort Bliss Military Reservation Environmental Division 2015).

The Department of Energy's Preferred Upstream Management Processes (PUMP) grant program gave the BLM the opportunity to address concerns with the survey-heavy program we had developed in southeast New Mexico. The purpose of the PUMP III project was to evaluate cultural resource management in oil and gas leasing areas and to identify changes that would allow continued energy development while promoting good stewardship of the archaeological record (Sebastian et al. 2005:15). A secondary goal was to create data management tools and models that would support the primary goal, hence the emphasis on the evaluation of survey data.

The PUMP III project evaluated the site record database resulting from 30 years of survey in three areas of southeastern New Mexico defined by eight quadrangle maps. The analysis revealed major challenges to continuing the practices of the previous 30 years.

DISTURBING FINDINGS ABOUT CONDUCTING "BUSINESS AS USUAL"

The most interesting finding of the PUMP III project and the one that led most directly to the Permian Basin Programmatic Agreement was this: Standard survey methods stopped yielding new information about the surface archaeology of the study area after survey coverage reached six to ten percent survey of the area. For most of the area that was subsequently covered by the Permian Basin PA, this point was reached prior to 2003. Adding more site records—and we have added more than 15,000 new site records since 6–10 percent survey coverage was achieved for the Mescalero Plain—has not appreciably helped our understanding of where sites might be or what they might consist of. Adding additional oil- and gas-related survey that boosted the survey coverage above 10 percent has not added appreciably to our understanding either.

The second major finding was that we had surveyed so many acres and so much of the area that most sites had already been crossed by one or more surveys. Between 1975 and 2002, when the PUMP III data were collected, some 4,997 ha (12,348 acres) of survey represented resurveys of areas already inventoried at least once before. Up to 40 percent of the modern ground surface had been surveyed in some areas, and well over 15 percent in many others. This finding was verified by a landscape-scale survey experiment, the Pierce Canyon project (Raymond et al. 2007). This carefully designed experiment overlaid an intensive pedestrian survey on a large block that had already seen both small-scale survey efforts associated with individual well-pad projects and larger transect surveys done in advance of seismic exploration. The Pierce Canyon experiment found that that 85 percent of all sites and 100 percent of the larger sites had been previously recorded, even though the previous surveys in the Pierce Canyon block had covered only 28 percent of the modern ground surface.

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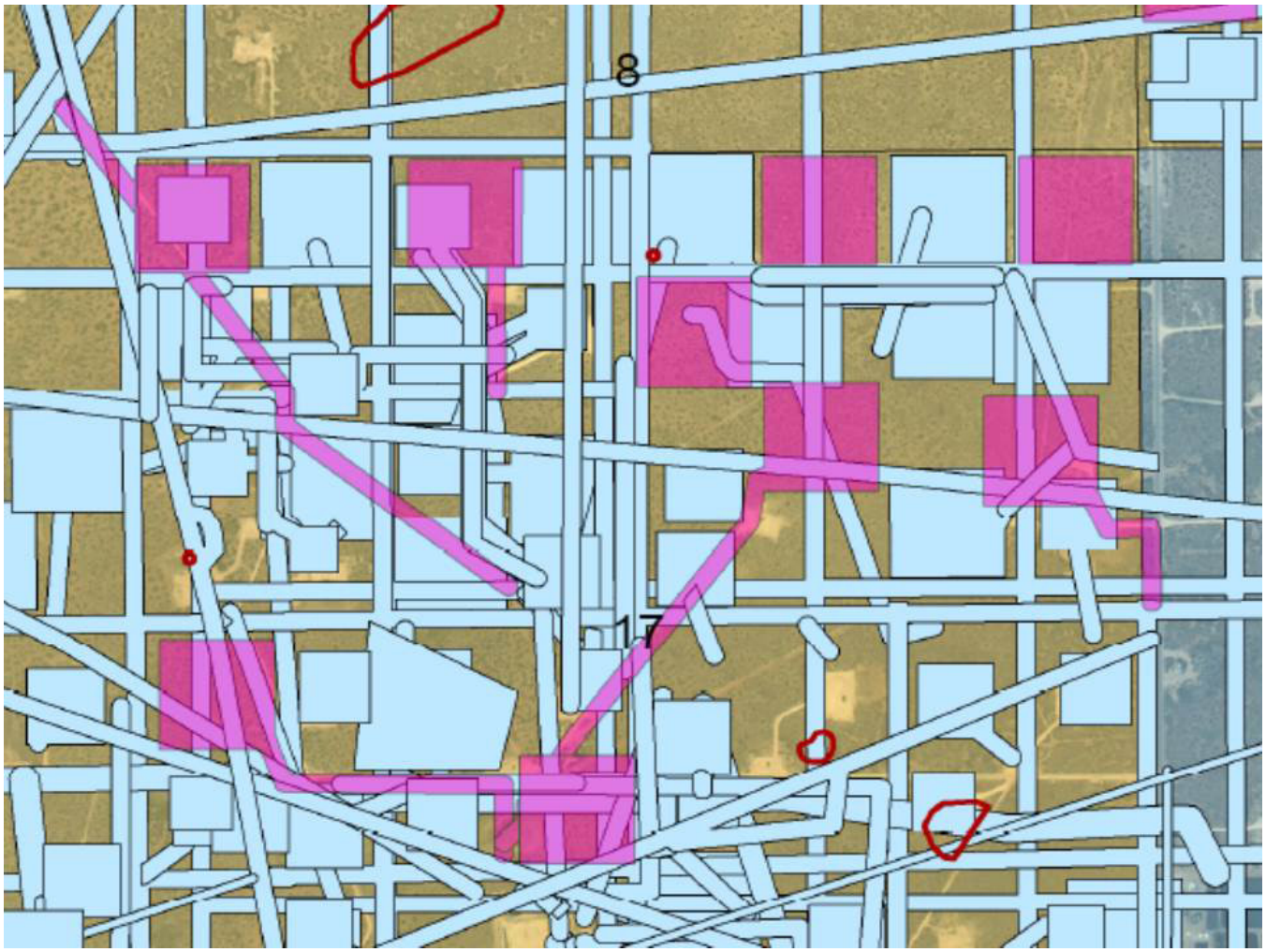

FIGURE 2. Typical location within the Permian Basin PA area, showing previous archaeological surveys in blue, previously recorded archaeological sites outlined in red, and projects approved under the Permian Basin PA in pink.

The PUMP III and Pierce Canyon projects established the need for change. Former New Mexico State Historic Preservation Officer Katherine Slick put it neatly: "We can all agree the need for change is undeniable. The alternative is that for another 20 years we continue doing the same things we have done for the last 20, giving us the opportunity to know less and less about more and more." (Katherine Slick, personal communication 2008).

The Permian Basin PA is grounded in the recognition that additional survey, done piecemeal as energy projects were proposed and analyzed in the Permian Basin, did not advance archaeological interests and was not an effective use of the limited resources that the BLM has to expend on archaeology. We suspect that this same problem pertains to many other regions where existing site data has not been as systematically evaluated as in the Permian Basin. The BLM's problems, of course, were also the SHPO's problems and the oil and gas industry's problems.

Unlike the Department of Defense or the Department of Energy, the Department of Interior is a department strapped for funding. Among national land-managing agencies (the BLM, the National Park Service, the U.S. Forest Service), the BLM budget consistently sits at the bottom in terms of funding per acre for cultural resources (Society for American Archaeology 2015). When we can find a way to use proponent funding to resolve our collective problems, we at least have a chance of finding the resources needed to address them.

THE BASIC ELEMENTS OF THE PERMIAN BASIN PROGRAMMATIC AGREEMENT

The Permian Basin PA outlines how the BLM will manage cultural resources in a 28-quadrangle area covering approximately 440,298 ha (1,700 square miles) of the most active oil and gas production lease areas in the Carlsbad Field Office. The PA is a mitigation document that addresses the long-term damage to cultural resources that has resulted from energy field development and continued operations. The PA is used only

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for seismic exploration, oil and gas undertakings, and associated roads, lines, and pipes, plus local units of government and potash-related actions similar in size and scope. Energy industry applicants must elect to participate in the program on a project-by-project basis. When applicants file an application for a permit to drill for projects located within the PA area, they indicate whether or not they wish to participate in the PA. If they choose to participate in the PA, they are required to contribute funds to the Permian Basin Cultural Resources Fund in the amount determined by a funding formula found in Appendix B of the PA. The Permian Basin Cultural Resources Fund is the pool of similar contributions by multiple firms who have elected to participate in the PA. The funding formulas were devised by a joint committee comprised of oil and gas companies, NMAC, the BLM, the SHPO, and a representative of NMOGA, based on the cost of comparable Class III inventories for similar projects and including an annual inflation factor. Applicants who elect not to follow the PA procedures work under the existing BLM-SHPO protocol. Operating under the PA is entirely voluntary. Figure 2 shows a typical location within the Permian Basin PA area, with previous archaeological surveys, previously recorded sites, and projects where applicants have elected to use the Permian Basin PA rather than opting for conducting Class III inventories. Details of the PA operation are outlined in Schlanger et al. (2013).

SEVEN YEARS OF ACCOMPLISHMENTS

Over the past seven years, a total of 65 companies have signed up to use the PA, and 51 have contributed funds in lieu of archaeological survey. Nearly 80 percent of the projects carried out in the Permian Basin PA area have been conducted under the PA procedures. As of September 21, 2015, 4,103 projects have been logged in, and mitigation pool contributions have totaled nearly $11 million (Bureau of Land Management Carlsbad Field Office 2015). Without the Permian Basin PA, those funds would have been spent on thousands of additional small surveys in the study area. Instead, the mitigation pool is being used to build a comprehensive field program that we hope will give the BLM a solid foundation for managing the area's archaeological resources.

A Permian Basin PA workgroup helps the BLM to develop and prioritize parts of the research program. Table 1 lists the projects accomplished to date or due to be completed shortly under the PA. Fifteen studies have been completed with mitigation pool funding, and four more are expected to be completed in 2016 with an average of about $250,000 dedicated to each study. Two rounds of small grants of up to $15,000 have been funded with Permian Basin PA funding, putting about $125,000 into the hands of the local research community. Table 2 lists studies completed under the small grant program. So far nearly $4 million, which constitutes more than one-third of the mitigation pool funds, has been spent on research studies and small grants, with about $7 million available for future projects. The BLM's own internal operations have kept pace with developments under the PA: The BLM's Carlsbad Field Office, which manages the public lands in the Permian Basin, retooled itself to manage all resources through an integrated Geographic Information System, a critical tool in implementing the PA. This system has replaced Mylar overlays, smudged 7.5' maps, and outdated electronic records. We now have a real-time picture of surveyed space and site locations, and, as importantly, where we still need to do more work.

We believe the PA has been both a successful management tool and an effective means of supporting archaeological research on the Mescalero Plain. One simple measure of the increase in our overall knowledge base is that the number of radiocarbon dates available to researchers has tripled since the inception of the Permian Basin PA. Some 40 years of archaeological research had yielded a total of 220 dates. The focus on sampling critical contexts for dates during seven years of implementation of the PA has resulted in an additional 612 radiocarbon-dated features for a total of 832 dates. These features also produced environmental samples that allowed researchers to identify economic plant remains at 256 sites within the PA area. The radiocarbon dating program confirmed our understanding that the majority of the sites in the PA area are small in scale and contain a very limited artifact and feature inventory, supporting our interpretation that the PA area was occupied by a small number of people inhabiting the area for short periods of time. A limited number of sites were found to be "villages" with probable structures and evidence of longer-term residency. Radiocarbon dates indicate that the majority of sites date to the Early Formative period within the PA area, but that other physiographic regions within the region may have a different site chronology. The Sacramento Section and the Pecos Floodplain/Terrace, for example, have a higher percentage of Late Formative sites.

Another major contribution has been the reinvestigation of a number of the rare, large habitation sites. The Lea County Archaeological Society excavated the few major village sites in the area during the early 1960s. These four sites, Boot Hill (LA 32229), Burro Tanks (LA 32227), Laguna Plata (LA 5148), and the Merchant Site (LA 43414), were revisited and reevaluated with funding that likely would never have become available without the PA (Bandy et al. 2011; K. Brown 2010; M. Brown 2011; Miller 2015). Stratigraphic control was established; contemporary mapping techniques were used; and analysis of flora, fauna and other environmental samples was conducted. These sites are unusual, if not unique. They add a critical layer of understanding and context to the surrounding archaeology of mobile hunter-gatherers.

The PA has also allowed the BLM to fund a collaborative field program with the Mescalero Apache Tribe. Prior to the inception of the PA, the BLM had not had the opportunity to support a Traditional Cultural Properties (TCP) survey with the Mescalero Apache Tribe. This survey, completed in the second year of the PA, has served as a catalyst for more cooperation between the tribe and the BLM Carlsbad Field Office.

The PA has also brought some much-needed structure to the recording, evaluation, and interpretation of the archaeology of the PA area and of the larger region. Previous site mitigation treated each site as though it existed in a vacuum. There was no effort to put the site into a context and no effort to identify what had been done in the past or to build on previous excavations. Artifacts were recovered, features excavated, and radiocarbon dates collected, but interpretation was limited to the immediate site area. Completed PA projects, such as the synthesis of previous excavations, the lithic source identification, and the evalu-

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ation of the 500 samples, have broadened the research horizon and brought useful information together in an easy-to-access format. The Transect Recording Unit (TRU) survey and surface/subsurface report (Heilen and Murrell 2015) has provided a blueprint for systematic site recording and individual site evaluation. What is needed now is for the BLM to implement changes to our recording and evaluation requirements and for the contract archaeologists to become more sophisticated in assessing a site's research potential.

As Tables 1 and 2 show, the PA has revitalized the research community of southeastern New Mexico. The wide range of research topics funded under the PA—obsidian and ceramic studies, the use of lidar to identify ring middens, the effectiveness of geophysical prospecting methods in this setting, to name a few—contributes to our understanding of the archaeology of all of southern New Mexico and beyond.

MEETING CONCERNS ABOUT THE PROGRAM: THEN AND NOW

The BLM and the other signatories to the Programmatic Agreement just finished a seven-year evaluation of the Permian Basin PA. The consensus was overwhelmingly in favor of continuing it, and as Martin Stein reported immediately afterwards, the evaluation meeting was about as close to everyone holding hands and singing "Kumbaya" as he had ever seen. This was not always the case, however.

The approach was met initially with a number of concerns from the archaeological community, BLM staff, and the signatories. Chief among these concerns was that previously unidentified sites might be damaged during development. While sites eligible for listing on the NRHP that had been identified through earlier survey were avoided (or if not avoided, then impacts were mitigated), the PA did not require new survey in advance of new installations proposed by participating companies. Would sites be damaged or destroyed in the PA area? The BLM has committed to an aggressive monitoring program that goes beyond the strict guidelines of the PA to ensure that project developments did not impact known sites. Information about sites affected by the PA comes from two sources: BLM Field Office archaeologists and staff doing compliance inspections and other field studies, and consulting firm archaeologists working on Section 106 surveys within the PA area for companies that opted not to use the PA protocol. Only three sites have been found through these efforts, two of them by BLM staff. The site found by a contractor was not affected by the PA project. The sites discovered by BLM were mitigated by project relocation and data recovery within the areas of the sites that were affected. Previously unknown sites that might be affected by projects conducted under the PA continue to be a focus of BLM concern. In 2016, the BLM will award a contract to resurvey a sample of PA projects to determine whether any sites were affected.

Another concern was how to learn about the archaeology of areas outside the oil patch. A major advantage of the PA is that it lets the BLM carry out surveys in under-surveyed areas, as indicated by previous research. Those surveys can be done systematically and benefit from having a clear research focus. We have completed survey in areas of the PA that were not intensively surveyed before, for instance, along the Pecos River bluffs. Other surveys are being done through the PA, including the lidar survey for ring-middens noted in Table 1. This additional survey gives us a more balanced view of the prehistoric occupation of southeastern New Mexico.

Yet another concern was that companies that opted in to the PA would no longer require the services of archaeological consultants and archaeological field crews. Did the PA adversely affect the small archaeological consulting firms that had been operating in the PA-affected area? Section 106 surveys are still being done within the PA area, and on the public lands within the region, Section 106 surveys still outnumber projects done under the PA. No firms have gone out of business due to the PA, and BLM records indicate that there has been a net gain of one consulting firm operating in the area since 2008. One firm in business during 2008 was sold; the new owner is still busy with a staff of four archaeologists. One larger firm has opened a field office in Carlsbad so that their archaeologists can be closer to work, and another small business from outside the area has started working in the Permian Basin.

During the recent PA evaluation, the concerns expressed about the PA focused on how the funds contributed by the oil and gas industry are contributing to archaeological understanding and research. Is public outreach sufficient? Is outreach to and involvement of Native American tribal governments, Tribal Historic Preservation Officers, and other tribal representatives sufficient? Is the Permian Basin workgroup functioning as it should? Is there sufficient oversight regarding how funds are spent?

Public outreach has been a major focus of the projects carried out to date with the research funds. The number and kinds of public outreach products have increased exponentially from pre-PA public outreach efforts, which were largely unfunded and left to the personal initiative of BLM staff archaeologists. Four times a year, the BLM distributes a newsletter that reports on the PA, the *Permian Quarterly,* to over 400 members of the professional archaeological community, the oil and gas industry, and Indian tribes and pueblos. The BLM has required public outreach and education programs as a standard practice. Education and outreach products have ranged in scope from public education booklets delivered to all the public and school libraries in southeast New Mexico to monographs available online that are designed for both professional and public use. Some task orders have called for public presentations, such as those that will be presented in the local communities of Carlsbad, Artesia, Lovington, and Hobbs, in conjunction with the publication of a plant identification book and the report on excavations at the Merchant Site (LA 43414). The BLM is looking into ways to develop opportunities for the public to participate in excavations, with a particular interest in making these opportunities available to schoolchildren. The BLM also plans to develop Project Archaeology (http://projectarchaeology.org/) materials and a curriculum that address the archaeology of southeastern New Mexico with Permian Basin PA funding. These efforts have helped to demonstrate to the oil and gas industry that the cultural resources projects they fund do have real-world benefits. The information shared engages local people with their local resources and benefits the community, and in turn this engagement benefits the BLM's efforts to manage cultural resources.

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TABLE 1. Contracts Completed or Due to Be Completed in 2016 with Permian Basin PA Funding, by Date of Report.

Year Completed	Title/Project Description	Consulting Firm	Authors	tDAR Identification Number
2009	*Synthesis of Excavation Data for the Permian Basin Mitigation Program*. Data from 116 excavated sites within the Permian Basin MOA area were synthesized.	SWCA Environmental Consultants	Railey, Jim A., John Risetto and Matthew Bandy	375484
2010	*A Class III Cultural Resource Survey of the Permian Basin MOA Area*. Chavez and Eddy Counties, New Mexico. Portions of the Permian Basin PA area that are underrepresented by previous archaeological inventories were inventoried and their archaeological landscape characterized.	Lone Mountain Archaeological Services	McCormack, Beth, Douglas H. M. Boggess, Peggy Allison, Theresa Cordua, Brian Deaton, Vicki Menchaca, Tomasz Wasowski, and Andrew Zink	378468
2010	*Ethnographic and Archaeological Inventory with the Mescalero Apache Tribe of Potential Traditional Cultural Properties in the Vicinity of the Permian Basin MOA, BLM Pecos District, Eddy County, New Mexico*. TRC inventoried nine locations selected in cooperation with the Mescalero Apache Tribe, Mescalero, New Mexico.	TRC Environmental, Inc.	Brown, Kenneth L., Martha Graham, Howard Higgins, Timothy G. McEnany, Stephanie Owens, and Mary Quirolo	This report contains confidential information and is not available for public distribution.
2010	*Archaeological Data Comparability for the Permian Basin Mitigation Program*. This project established a set of standards to be utilized by anyone conducting fieldwork in the PA area so that sites, features, and artifacts would be recorded in a consistent manner.	SWCA Environmental Consultants	Jim A. Railey	Available from BLM on request.
2010	*The Laguna Plata Site Revisited: Current Testing and Analysis of New and Existing Assemblages*. This project examined artifact and faunal collections from this important site, relocated previous excavations, described the archaeological potential of two landforms in the site's vicinity, provided an interpretation of the site's use in the Archaic and Formative Periods, and evaluated the site's future archaeological research value.	TRC Environmental, Inc.	Brown, Kenneth L., editor	378476
2011	*The Boot Hill Site, an Oasis in the Desert, Eddy County, New Mexico*. One goal of the project was to provide a better assessment of the early work at this large and unusual site.	TRC Environmental, Inc.	Brown, Marie E., editor	37547
2011	*A Class III Transect Recording Unit Survey and Geophysical Prospection at the Burro Tanks Site (LA 32227), Chaves County, New Mexico*. This project provided detailed baseline documentation of the present condition of this large, complex site, including protection and research recommendations.	SWCA Environmental Consultants	Bandy, Matthew S., Jim A. Railey, Christopher Carlson and Blake Weissling	378478
2012	*Delaware River Thematic Survey*. This project inventoried prehistoric and historic sites in the Delaware River Valley to be used in preparation of a National Register of Historic Places nomination and for management of the Delaware River Area of Critical Environmental Concern.	Lone Mountain Archaeological Services	Boggess, Douglas, Beth McCormack, Catherine Spude, and Kimberly Parker	Available upon request from BLM.

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TABLE 1. Contracts Completed or Due to Be Completed in 2016 with Permian Basin PA Funding, by Date of Report.

2013	*Macrofloral, Phytolith, and Starch Analysis, and AMS Radiocarbon Dating for the Permian Basin MOA, New Mexico*. The project analyzed 500 AMS radiocarbon samples collected from feature contexts by BLM Carlsbad Field Office cultural resource staff, as well as 500 duplicate samples collected at the same locations for environmental and subsistence evidence looking at starch, phytolith and macrobotanical remains.	PaleoResearch Institute	Cummings, Linda Scott and Kováčik, Peter	39881
2013	*The Geologic and Archaeological Contexts for Lithic Resource Acquisition in Southeastern New Mexico*. This multidisciplinary study by archaeologists and geologists identified geological formations in Eddy, Chaves, and Lea Counties that contain rocks suitable for making stone tools and documented the methods used by prehistoric people to obtain those lithic resources.	Statistical Research, Inc.	Kremkau, Scott H., Kate E. Zeigler, and Bradley J. Vierra	391880
2013	*Rocks and Ancient People in Southeastern New Mexico*. This companion publication to The Geologic and Archaeological Contexts for Lithic Resource Acquisition in Southeastern New Mexico is designed for public distribution.	Statistical Research, Inc.	Vierra, Bradley J., Kate E. Zeigler, and John V. Cañero	Available at the BLM New Mexico State Office website
2015	*Archaeological Prospection for Ring-Midden Features in Southeastern New Mexico Using Lidar Data: An Experimental Study*. This project developed a method for recognizing ring-midden features using Lidar data for three study areas located in the Guadalupe and Sacramento foothills. Over 500 middens were identified, and though only a small number have been field-checked, Lidar appears to be a productive method for the initial survey of these features.	Statistical Research, Inc.	Heilen, Michael, Monica Murrell, Timothy Mills, Nahide Aydin, Phillip Leckman, and Adam Byrd	To be obtained
2015	*An Experimental Project to Conduct Digital Survey for Ring-Midden Features Using Lidar Data*. This companion publication to Archaeological Prospection for Ring-Midden Features in Southeastern New Mexico Using Lidar Data: An Experimental Study is designed for public distribution.	Statistical Research, Inc.	Heilen, Michael	Available at the BLM New Mexico State Office website
2015	*An Assessment of Transect Recording Unit Survey and Subsurface Testing Methods at Four Sites in the Permian Basin, New Mexico*. This project examined the pros and cons of using the Transect Recording Unit method of archeological survey and evaluated the effectiveness of different testing methods, ranging from hand tools to the use of power machinery, on representative sites in the Mescalero Plain.	Statistical Research, Inc.	Heilen, Michael and Monica L. Murrell, editors	To be obtained
2015	*Selection of Sites to Address Questions in the Southeastern New Mexico Regional Research Design: A Landscape Approach*. This study identified the research potential of 256 archeological sites primarily located in the Mescalero Plain, developed a ranking system for future site evaluation, and recommended sites for testing and excavation.	SWCA Environmental Consultants	Stovel, Emily, Jim A. Railey, and William T. Whitehead	398963

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TABLE 1. Contracts Completed or Due to Be Completed in 2016 with Permian Basin PA Funding, by Date of Report.

Due in 2016	*Archaeological Inventory and Historic Context for Areas of Early Oil and Gas Exploration and Development in the Permian Basin of Southeastern New Mexico.* This document will provide guidelines for determining National Register eligibility of historic oil and gas infrastructure and for managing these resources in a way that will preserve key elements and representative samples of important property types while facilitating environmental clean-up of non-contributing oil field locations.	SWCA Environmental Consultants
Due in 2016	*Remediation at the Merchant Site (LA 43414), Lea County, New Mexico*. The Merchant Site is a ca. AD 1400 village partially excavated by the Lea County Archaeological Society in the early 1960s but never backfilled, and with unpublished results. The project will map the site and conduct analysis of artifacts and especially faunal remains from the site, thought to be an important trading center with the Plains.	Versar, Inc.
Due in 2016	*A ReferenceBook: Prehistoric Plant Utilization in Southeastern New Mexico.* The project will result in a reference book on plant utilization by prehistoric and early historic peoples of southeastern New Mexico suitable for use by the public and by the professional archaeological community.	SWCA Environmental Consultants
Due in 2016	*Revision and Updating of Southeastern New Mexico Regional Research Design*. As a requirement of the PA, the Southeastern New Mexico Regional Research Design will be revised and updated to reflect the results of PA research over the past seven years.	SWCA Environmental Consultants

Publically funded archaeological research depends upon the support of a knowledgeable public.

The BLM has been reaching out to Native American tribes and pueblos, but we do recognize that tribal outreach can always be improved. The Permian Basin MOA was developed in consultation with the seven tribes and pueblos that have ancestral ties to southeastern New Mexico. The Hopi and Mescalero Tribes were Consulting Parties during negotiation of the MOA, and these two Tribes have expressed sustained interest in the Permian Basin PA program. The BLM will conduct additional outreach to all seven tribes during the upcoming PA extension and during the implementation of the new PA.

The concerns with regard to the workgroup and project development are more difficult to assess. The PA is far more successful than any of us anticipated, and the BLM has been careful to keep accurate records of funds contributed by industry and to share those records with the public. The BLM has also been very conscious of the need to be as transparent and objective as possible in the distribution of those funds. Our small grant program is carried out with oversight by the SHPO. Our larger projects are awarded to cultural resource consultants and other appropriate providers through a strict, competitive contracting process. The BLM is currently administering the second round of an Indefinite Quantities contract for projects developed through the Permian Basin PA. Each round of contracting has resulted in awards to four separate archaeological consulting firms through a competitive bid process that weighed contractor qualifications to provide services ranging from Class III inventories to data recovery to the preparation of NRHP nominations and ethnographic studies. The contracts are renewable each year for a five-year term. When the BLM initiates a task order for a specific project, all four contractors have the opportunity to bid on it. The selection of the contractor or contractors to carry out any given task order is based on evaluation factors, including qualifications, technical approach, and cost, that are developed specifically for that task order.

The very success of the PA, however, has led to some issues for the BLM. The biggest issue is that the program requires a lot more administration and considerably more hands-on management than we had planned on. We had done some projections of what kinds of projects might be conducted under the PA, rather than through the traditional 106 process, and the analyses suggested that the program might generate a substantial mitigation fund. Because this was a new project, however, we did not press to use PA-generated funds to support additional BLM staff. We have since had to reevaluate that decision. Although the BLM now has a full-time position dedicated to PA administration, it remains a struggle to keep up with monitoring sites to make sure that no resource damage is occurring. We also

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TABLE 2. Small Grants Program (up to $15,000) funded through the Permian Basin PA in cooperation with the New Mexico Historic Preservation Division, by year completed.

Year Completed	Title	Authors	Affiliation
2011	*Investigations at LA 143472: An Unusual Village in Southeastern New Mexico*. This project involved documentation and testing of an unusual village site atop Guadalupe Ridge in Eddy County, New Mexico.	Graves, Tim and Mark Willis	
2012	*Berino Paleosol, Late Pleistocene Argillic Soil Development on the Mescalero Sand Sheet in New Mexico*. The focus of this project was to use Optically Stimulated Luminescence dating to determine the geochronology and paleoenvironment of the Berino Paleosol.	Hall, Stephen and Ronald Goble	
2014	*Compositional Analysis, Nutt Mountain Obsidian Source, Sierra County, New Mexico*. The goal of this project was to collect samples from the Nutt Mountain obsidian source near Hatch, New Mexico and establish compositional data in order to identify archaeological specimens produced from this obsidian.	Ferguson, Jeff and Steven Shackley	Research Reactor Center, University of Missouri and Geoarchaeology XRF Lab
2014	*Understanding Sources of Variability in Brownware Ceramics from Southeastern New Mexico*. This project identified possible sources of brownware ceramics from archaeological sites in southeastern New Mexico and how they relate to local ceramic typologies.	Hill, David A.	APAC
2014	*Survey and Documentation of Four Rock Art Sites in Eddy County, New Mexico*. Four sites, Walt Canyon, Boyd's Cave, Ruby Canyon, and the Roney Site, with 29 panels of rock paintings, were recorded during this project.	Loendorf, Lawrence L., Laurie White, Mark Willis, and Myles R. Miller	Versar/Geo-Marine, Inc.
2014	*Prehistoric Rock Art on BLM Lands in Eddy County, New Mexico*. This booklet for the public was developed from Survey and Documentation of Four Rock Art Sites in Eddy County, New Mexico.	Loendorf, Lawrence L., Laurie White, Mark Willis, and Myles R. Miller	Versar/Geo-Marine, Inc.
2014	*Detection of Buried Archaeological Features in the Mescalero Sand Plain Using Geophysical Survey Methods*. This investigation assessed the effectiveness of non-invasive geophysical methods in detecting and mapping buried archaeological features in the Mescalero sand plain.	Maki, David, Joshua Feinberg, Julia Palmquist, and Michael Tomiak	Archaeo-Physics LLC and University of Minnesota

underestimated the time that would be needed for program development and contract administration and the time it takes to collaborate with our partners. To cope with the increasing demands of administering the PA, the BLM is adding an additional archaeological technician dedicated to the Permian Basin PA in 2016. The BLM will continue to monitor and respond to administrative costs and needs as the PA is extended in the future.

The workgroup, which is composed of representatives from the archaeological research community, the SHPO, the BLM, the ACHP, and industry, and a representative from each of the seven Indian Tribes and Pueblos, is one of the key elements of the program. Archaeological consulting companies working under contract to carry out field programs under the PA are often invited to workgroup meetings. The BLM has endeavored to invite participants representing a broad range of interests, but it has been difficult for the volunteer group to maintain a robust membership. Even so, the breadth of projects identified in Table 1 attests to the success of this group and to the critical nature of having a peer group such as this significantly involved in the development of research questions and field programs.

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This year, the BLM has contracted for an update of the Southeastern New Mexico Regional Research Design (Hogan 2006) based on the results of the past seven years of work, as required by the PA. This update will be completed within eight years of the initiation of the PA, which in itself represents a commitment to the basic sequence of a good, iterative adaptive management program driven by science: question formulation/identification of management concerns; data collection and field study; synthesis and evaluation; management change and the generation of new research programs. The updated research design will guide the next few years of the program. This is a far cry from the 30-year gap between data collection and management change that we saw in southeastern New Mexico before the Permian Basin initiative.

MOVING AHEAD

One of the management changes we see in the near future is the expansion of the portion of southeastern New Mexico that is addressed under the Permian Basin PA. The BLM is proposing that the area be expanded to include additional oil and gas fields that are now experiencing heavy energy development. Given our experience with the older fields and the monitoring program that has practically eliminated additional site damage in the current PA area, we believe that this expansion is warranted, perhaps even required.

We see untapped potential for the use of this approach on the public lands and elsewhere, but many archaeologists are not comfortable trading intensive survey for an integrated research program, even when we know a lot about the survey area. Archaeologists also do not want to share data with industry and are not comfortable with trade-offs that may increase the potential for site damage or destruction, regardless of the benefits. Until now, archaeologists have been willing to tolerate an astronomical amount of duplication of effort and redundancy in practice to avoid these areas of discomfort.

The Permian Basin PA is only one answer to how to change archaeological practice. We do not believe that this is the only path forward, or that the PA protocols will be useful in every part of America's "oil patch." The best outcomes of the PA are not restricted to energy development. In essence, the PA has succeeded because it gives archaeologists additional control over where and when we commit our resources, it gives SHPO some confidence that site damage is not continuing to occur, and it gives industry the predictability and control over schedules that they need to operate efficiently. A similar approach might be used to address problems that affect archaeological practice anywhere the traditional Section 106 process is leading to inefficiencies and the growth of knowledge regarding regional archaeology is at a standstill. Should these issues affect the areas where you work, we suggest the following best management practices:

- Identify what does not work and how badly it is not working—is it worth fixing?
- Find out what you know, what you do not know, and what is driving your learning or lack thereof
- Seek out "win-win" scenarios and partnerships, especially with partners who have money or can help broker agreements
- Put in the time to come up with solutions, regardless of how much they may diverge from current practice
- Look for partners in other programs, including those within your own agency, and partners in other agencies and organizations
- Tailor the solution to your specific area and its specific problems
- Pay back the professional community, the avocational community, and the general public by making research results available to them in appropriate formats
- Finally, plan to succeed, and put frameworks and processes in place that can adapt to changing circumstances.

We once characterized the Permian Basin PA as an exercise in "going big" (Schlanger et al. 2013). Today, we see it as an exercise in learning how to "think big." While you figure out how this applies to where you work, we will be figuring out how to improve our successful PA.

Acknowledgments

The Permian Basin PA program owes a great debt to the people who negotiated the initial Memorandum of Agreement: for the BLM, Stephen Fosberg, then the New Mexico Cultural Resources Program lead, and George MacDonell, then the Carlsbad Field Office Cultural Resources lead; for the New Mexico State Historic Preservation Office, Katherine Slick, then the State Historic Preservation Officer, and Jan Biella, Deputy Historic Preservation Officer, who has continued to provide leadership throughout the duration of the PA; and especially Nancy Brown, the BLM's liaison with the Advisory Council on Historic Preservation. Without the Council's help in brokering the agreement, it is doubtful that it would have ever come to fruition. We also thank the members of the PA workgroup for their ideas, guidance, and sustained participation in the program; and our cultural resources contractors and researchers, who have produced excellent reports under the PA. Lastly, we appreciate the thoughtful comments of three anonymous reviewers whose suggestions greatly improved this paper.

Data Availability Statement

Data and statistics reported in this paper are available at the Bureau of Land Management Carlsbad Field Office, Carlsbad, New Mexico, as are reports produced with Permian Basin PA funding.

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