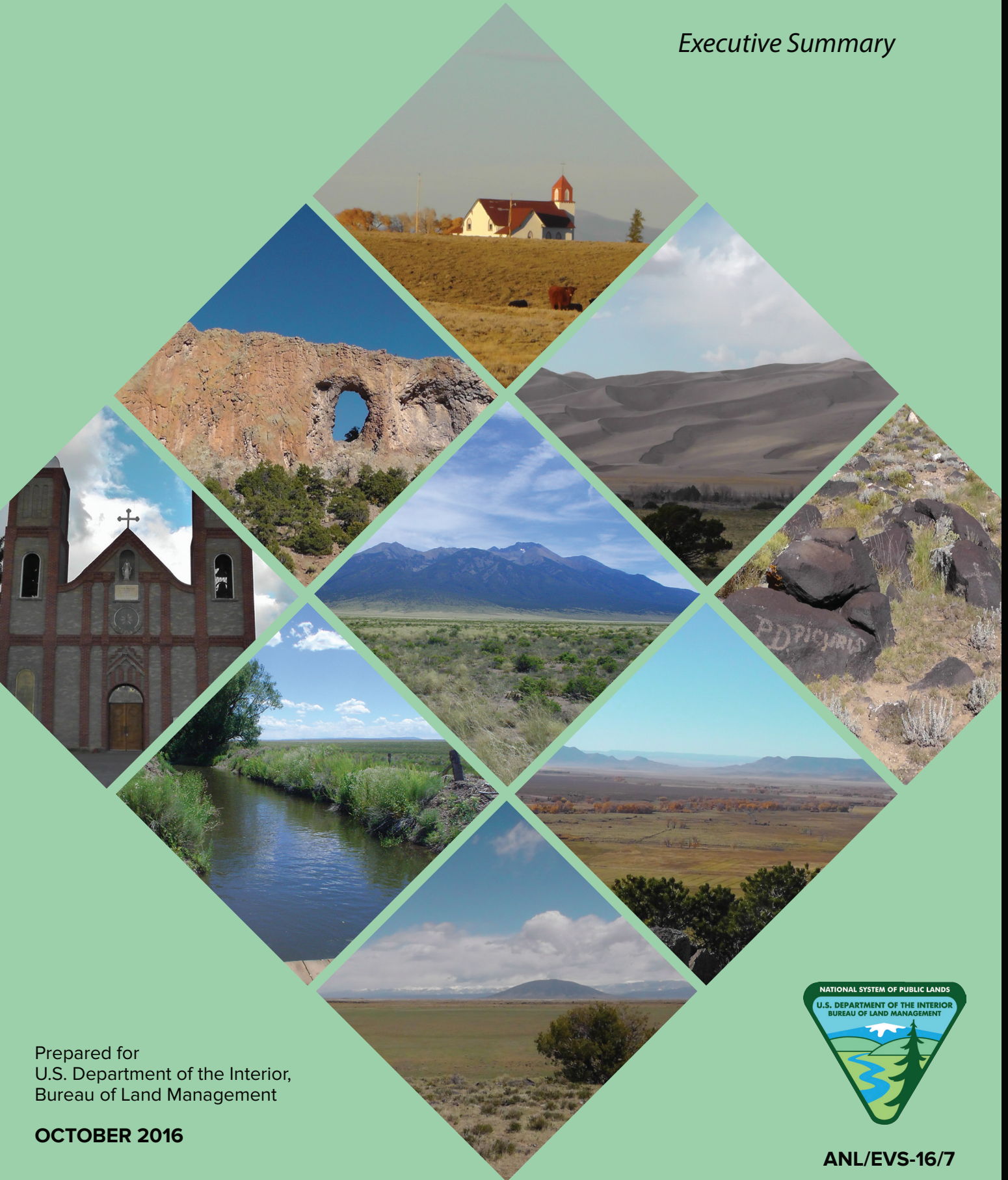


# San Luis Valley — Taos Plateau Landscape-Level Cultural Heritage Values and Risk Assessment Final Report

*Executive Summary*



Prepared for  
U.S. Department of the Interior,  
Bureau of Land Management

**OCTOBER 2016**



**ANL/EVS-16/7**

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Photos: Wescott, Konstance (Argonne National Laboratory).

From top to bottom (and left to right): La Garita (Oct. 2014), La Ventana (Oct. 2014), Great Sand Dunes (May 2014), Our Lady of Guadalupe Church (Sept. 2014), Blanca Peak (July 2009), rock art (Sept. 2014), irrigation ditch (July 2009), agricultural fields near San Luis (Oct. 2014), Rio Grande del Norte National Monument (May 2014).

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## *Executive Summary*

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Prepared for  
Bureau of Land Management

Prepared by  
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## ACKNOWLEDGMENTS

The San Luis Valley – Taos Plateau Landscape-Level Cultural Heritage Values and Risk Assessment is a Bureau of Land Management (BLM) pilot project that supports the Colorado Solar Regional Mitigation Strategy (CO SRMS) for three solar energy zones designated in the San Luis Valley, Colorado. This project is a joint effort of a core cultural team comprised of Argonne National Laboratory (Argonne) archaeology, ecology, visual resources, and geographic information system (GIS) staff (Konnie Wescott – Principal Investigator – and Jennifer Abplanalp, Bruce Verhaaren, Lee Walston, Katie Rollins, Bob Sullivan, Emily Zvolanek, and Heidi Hartmann), BLM CO SRMS Project Manager Joe Vieira, Lead Forest Service archaeologist Angie Krall, Lead San Luis Valley BLM archaeologist Brian Fredericks, Lead Taos Field Office archaeologist Merrill Dicks, and Front Range District BLM realty specialist Jeff Brown. The pilot was funded by BLM-Colorado. Early on, the core team received exceptional support during an opening interagency kickoff workshop in May 2014 from Kate Winthrop, BLM Washington, DC, Office archaeologist; Fred Bunch, Great Sand Dunes National Park and Preserve archaeologist; Erin Hegberg, Forest Service archaeologist; Brian Cantwell, former Argonne GIS specialist; Doug Simon, BLM GIS specialist; and Arnie Valdez, adjunct associate professor in the School of Architecture and Planning at the University of New Mexico. These individuals brought the experience from various agencies and projects to benefit discussions of data sources, issues, methodology, and the highest level resources of significant cultural value. Data were graciously provided by the Colorado and New Mexico State Historic Preservation Offices, the National Trails Program within the National Park Service, and BLM and Forest Service GIS staff. Much of the environmental and change agent data was compiled by Lee Walston as part of a sister effort in the *San Luis Valley – Taos Plateau Level IV Ecoregion Landscape Assessment*. Meg Van Ness, U.S. Fish and Wildlife Service Region 6 archaeologist, provided helpful insight and thoughts on the regional data and models. We received excellent support from the BLM SRMS Assessment Management Team throughout the process as we provided updates: Andrew Archuleta, Melanie Barnes, Tom Heinlein, Paul Tigan, Dan Haas, and Bruce Rittenhouse, as well as from the BLM Washington Office Cultural Heritage staff: Byron Loosle, Kate Winthrop, and Emily Palus. Finally, an excellent peer-review workshop team provided comments at a November 2015 workshop; the team included Kirk Halford, BLM Idaho Deputy Preservation Officer; Dan Martin, Washington Office geospatial archaeologist; Jamie Palmer, Cedar City Field Office archaeologist; Nancy Keohane, BLM acting project manager for Colorado Renewable Energy Team; Meg Van Ness, USFWS archaeologist; Mary Sullivan, CO Office of Archaeology and Historic Preservation Information Management Director; Jan Biella, NM Deputy State Historic Preservation Officer (SHPO) and state archaeologist; Christina Gallegos, Executive Director of the Sangre de Cristo National Heritage Area; Arnie Valdez, University of New Mexico; Lane Cowger, AZ BLM Renewable Energy Coordination Office Project Manager; Cynthia Herhan, BLM NM State Office cultural resource specialist; Art Hutchinson, National Park Service-Intermountain Region Chief of Planning; Karla Rogers, BLM National Operations Center; Rob Sweeten, UT BLM landscape architect and BLM Old Spanish National Historic Trail National Trail Administrator; Doug Simon, San Luis Valley BLM GIS specialist; and Kate Winthrop, Washington Office archaeologist. Several others were invited to participate in the peer-review workshop but were unable to attend.

## **PREFACE**

The cultural heritage values and risk assessment pilot was initiated with a multi-agency kickoff workshop in the San Luis Valley in May 2014. The pilot was introduced to public stakeholders in early September 2014 at the first public workshop on the Colorado Solar Regional Mitigation Strategy (CO SRMS) at Adams State University. At that time, the project was just getting started; data were still being collected, and a model was being hypothesized for how the process might continue to unfold. There appeared to be a positive reaction from the stakeholders to extending the Rapid Ecoregional Assessment (REA) concept, which was predominantly associated with ecological resources, to the human dimension. In late October, the status of the pilot project was presented to several tribes and federal agencies that were present in Del Norte, Colorado, for a meeting of the San Luis Valley Native American Graves Protection and Repatriation Act Working Group. The academic community was informed of the project at the Society for American Archaeology meetings in San Francisco in April 2015. Tribes present at the Mt. Blanca Summit at Fort Garland were updated again in May 2015. Stakeholders were also updated on the project's progress in May 2015 in conjunction with another public workshop on the CO SRMS. A final peer-review workshop for the cultural assessment was held in mid-November 2015 with subject-matter-expert representatives from many agencies, including BLM (CO, DC, ID, and UT), Forest Service, National Park Service, U.S. Fish and Wildlife Service, the Sangre de Cristo National Heritage Area, CO State Historic Preservation Office (SHPO) and NM SHPO, and a professor from the University of New Mexico, who helped contribute to the Hispano resources conservation element.

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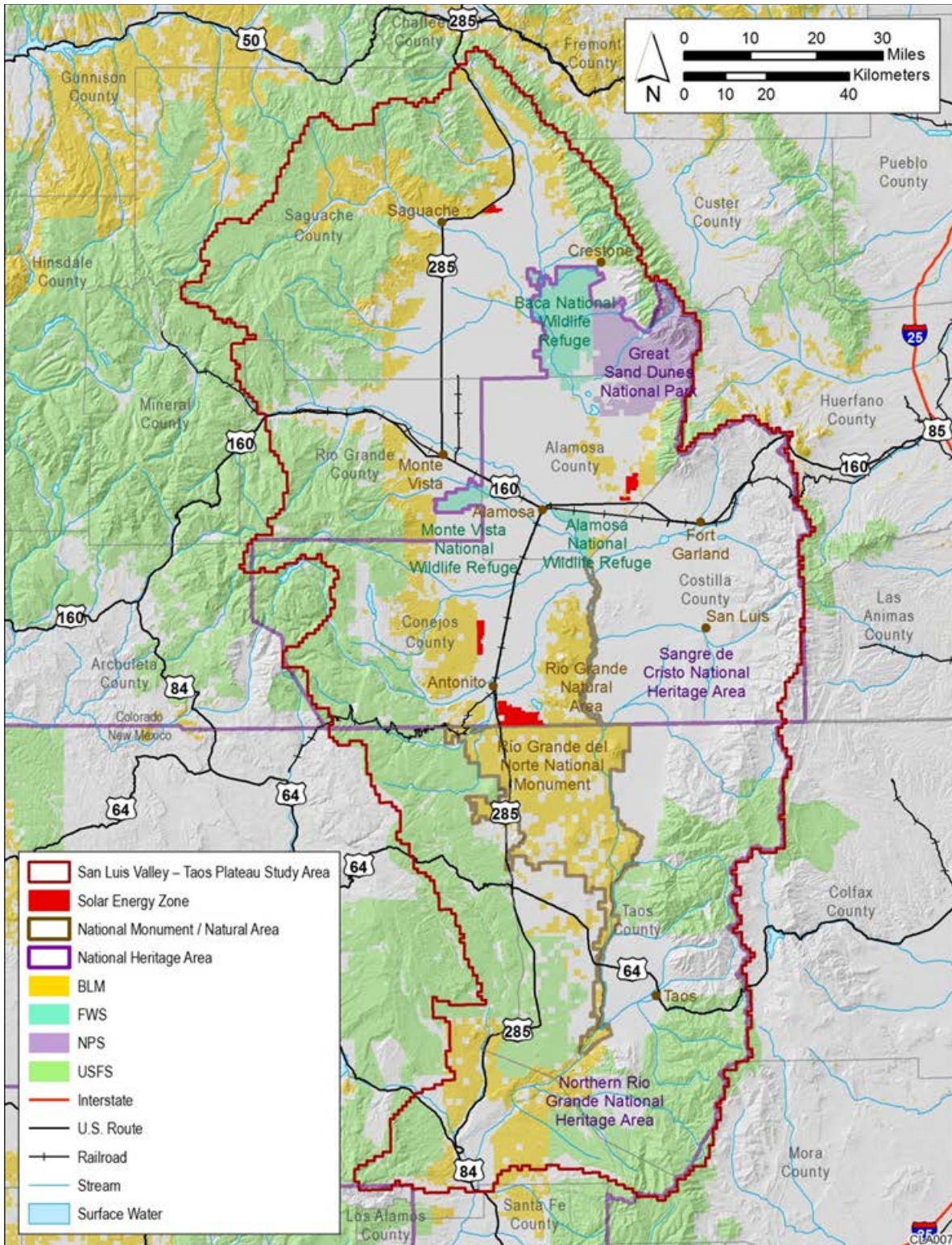
## **SAN LUIS VALLEY – TAOS PLATEAU LANDSCAPE-LEVEL CULTURAL HERITAGE VALUES AND RISK ASSESSMENT**

### **EXECUTIVE SUMMARY**

The San Luis Valley – Taos Plateau Landscape-Level Cultural Heritage Values and Risk Assessment (hereafter referred to as the cultural assessment) is a Bureau of Land Management (BLM) pilot project designed to see whether the Rapid Ecoregional Assessment (REA) framework (already established and implemented throughout many ecoregions in the West) can be applied to the cultural environment. The San Luis Valley – Taos Plateau is a Level IV ecoregion, slightly smaller than the Level III ecoregions typically studied for the REAs, but it is of a scale that is well-suited for the cultural assessment. The Level IV ecoregional boundaries correspond well to landscape features that have defined the cultural movements, land uses, and viewsheds within the area for thousands of years and that continue today (Figure 1; Photos 1 and 2). A fundamental purpose of the assessment is not only to capture data regarding the past activities that have shaped the collective history and cultural heritage of the region, but to get a glimpse of the future and how various change agents (human development, climate change, wildfire, and invasive species) might affect those resources. The expert knowledge of experienced BLM, Forest Service, National Park Service, and U.S. Fish and Wildlife Service cultural heritage/archaeology staff and many others who have lived and worked in the San Luis Valley – Taos Plateau were critical in the assessment for identifying conservation elements and establishing the baseline data set of what is currently known and culturally valued at the ecoregional scale (Photo 3).

The cultural assessment identified six management questions to frame the regionally important land management issues for the BLM tied to cultural resources. The management questions guide the identification and evaluation of conservation elements and how they interact with and may be influenced by various change agents. The management questions include:

- Where do areas of cultural resource management and protection occur (National Monuments, Areas of Critical Environmental Concern, National Historic Landmarks, World Heritage Areas, Scenic and Historic Byways, etc.)?
- Where are known historic properties, traditional cultural properties, and sacred sites and landscapes?
- What are the traditional cultural land use patterns?
- Where are known historic properties, traditional cultural properties, and sacred sites vulnerable to change agents?



**FIGURE 1 San Luis Valley – Taos Plateau Study Area**



**Photo 1: Blanca Peak: Prominent Landscape Feature in the San Luis Valley Important to Many Cultures (Photo Credit: K. Wescott, Argonne, July 2009)**



**Photo 2: Great Sand Dunes (Photo Credit: K. Wescott, Argonne, December 2015)**



**Photo 3: Our Lady of Guadalupe Catholic Church, Known as the Oldest Church in Colorado (Photo Credit: K. Wescott, Argonne, July 2009)**

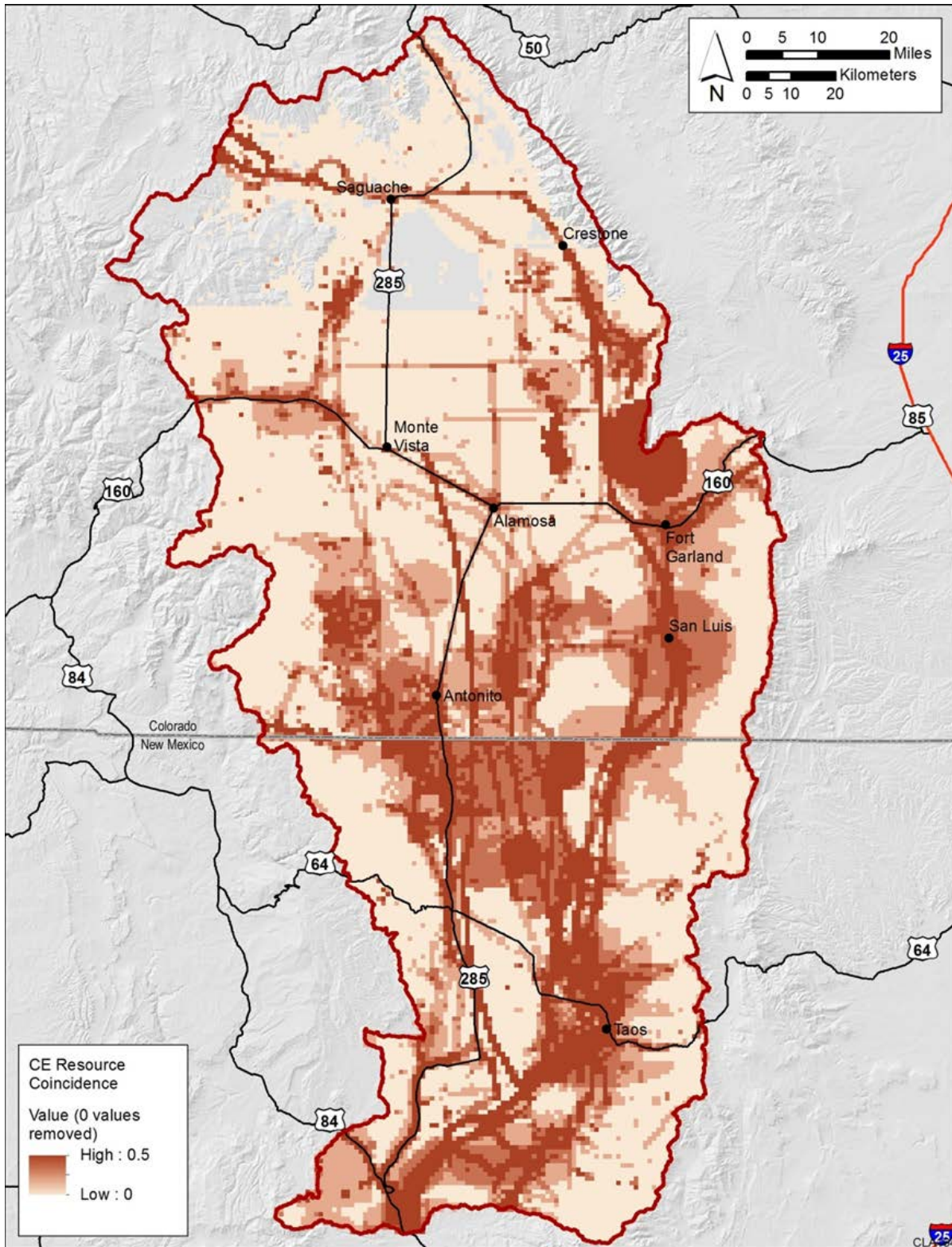
- Where are high-potential areas or high-density areas for historic properties that address the highest priority research goals?
- Where is cultural landscape connectivity vulnerable to change agents?

Based on the management questions, the cultural assessment evaluated seven conservation elements that were viewed as key components of the cultural landscape:

- Places of Cultural Importance to Tribes
- Traditional Resource Collection Areas
- Trails, Passes, and Travel Corridors
- Hispano Land Grants, Communal Use Patterns, and Places of Cultural Importance
- Eligible Prehistoric Properties
- Eligible Historic Properties
- Paleontology

Readily available data, including narrative information available in historic context documents, ethnographies, and local expert knowledge, were compiled spatially. Information on non-designated trail systems, acequias, and heritage areas was converted to spatial data from various non-digital maps, drawings, and other sources. Of particular importance was an ethnographic study conducted to obtain cultural/historical information on sacred landscapes and Traditional Cultural Properties, specifically in relation to impacts of solar development in the Solar Energy Zones (SEZs) on these resources (Higgins et al. 2013). Additional ethnographies in the region that focused on the Great Sand Dunes and the Old Spanish Trail were also consulted. No field work or intensive literature reviews were conducted for the purposes of the assessment, but existing detailed spatial data of surveys and sites were incorporated from the Colorado and New Mexico State Historic Preservation Offices (SHPOs). Data on National Historic Trails, National Historic Landmarks, and *National Register of Historic Places* from the National Park Service were also collected and incorporated. The ethnographic and archaeological sites and certain trail data are sensitive and protected; the spatial information has been rolled up in a 1 km<sup>2</sup>-sized grid and in combination with many other resources so as to not compromise sensitive locations (Figure 2). Individual conservation element spatial data layers will not be made available to the public, but will be provided to the individual federal agencies for management purposes.

Non-cultural data sets (e.g., land cover types, vegetation communities) on the baseline environmental conditions were identical to those used for the ecological Landscape Assessment (Walston et al. 2016). All of the change agent data sets and most of the data models were also the same. However, the derived models for landscape intactness were not applicable for use in the



**FIGURE 2** Areas of Coincidence of Multiple Cultural Conservation Element Resources

cultural assessment, because the parameters for landscape intactness (or naturalness) do not tell a complete story about the intactness of a cultural landscape, especially when that story is tied to some sort of landscape modification. Instead, using the same underlying data set on human development, a number of parameters were established to create an image of cultural landscape condition based on the degree of influence of a development-related activity on a cultural resource. For example, the presence of a dirt road may adversely affect resources by creating access that may lead to inadvertent or purposeful damage to a site. There is a distance at which that effect may be at its highest and then decline beyond that point. These types of variables were taken into account to create the illustration of current and future cultural landscape condition based on development activities shown in Figure 3.

Impacts on cultural resources are not limited to direct physical impacts on a property or site. Other types of impacts such as visual intrusions and auditory disturbances can affect one's capacity to use or enjoy a place of cultural importance. This includes, but is certainly not limited to, impacts on a tribal member's ability to perform or participate in a traditional ceremony, a trail enthusiast's ability to hike along a National Historic Trail route and experience the setting of those who traversed the trail during its period of significance, a researcher's ability to search for answers to landscape-level questions because the landscape no longer looks the same, and possibly even a Hispano farmer's ability to enjoy the experience of traditional agricultural practices in a traditional setting. These are the landscape-level types of cultural values that the cultural assessment attempts to address in terms of where these resources (cultural conservation elements) are and where they are subject to future risk, not only from development, but also from other change agents.

To address less tangible impacts such as visual impacts, a viewshed analysis was conducted to look at a number of key observation points within the ecoregion tied to specific cultural resources with a known setting component that is vital to the resource (as examples, Blanca Peak and the Old Spanish National Historic Trail). The viewshed analysis (Figure 4) took into account intervening topography that may preclude a view, but otherwise provided a buffer of sorts to add to the cultural value footprint of certain resources. The viewshed analysis also considered distance as a weighting factor, so the derived cultural value of an area declined as the distance from the resource increased.

In addition to the presence of cultural conservation elements and select viewsheds, BLM and Argonne National Laboratory (Argonne) also considered the lack of cultural resource surveys in the ecoregion, the potential for additional resources to be present, and how these factors affect our current understanding of cultural resource distributions. An archaeological research potential model (Figure 5) was created to take into account some of that uncertainty due to the lack of surveys and research and also to consider the areas of known higher potential, for example, along water courses. The intent of the model is not to predict where resources are located, but to incorporate areas that might offer opportunities for research, conservation, and possibly mitigation into future planning.

In the cultural assessment, all of the above factors (presence of resources, viewshed value, and research potential) produce the "cultural value" of a given area (Figure 6). As identified in the valuation scale of Figures 2, 4, and 5, the coincident presence of resources was

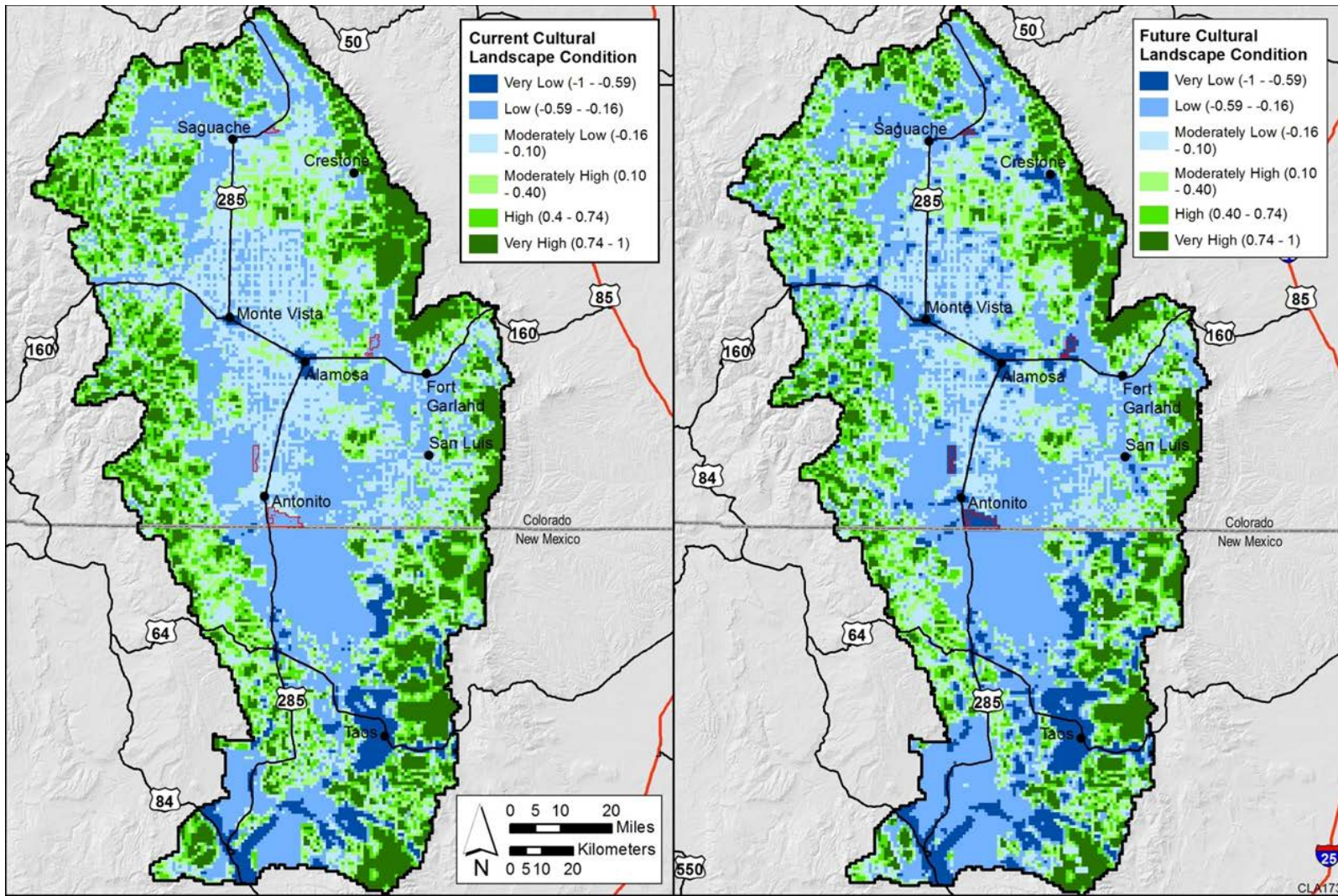


FIGURE 3 Current and Future Cultural Landscape Condition in the San Luis Valley – Taos Plateau



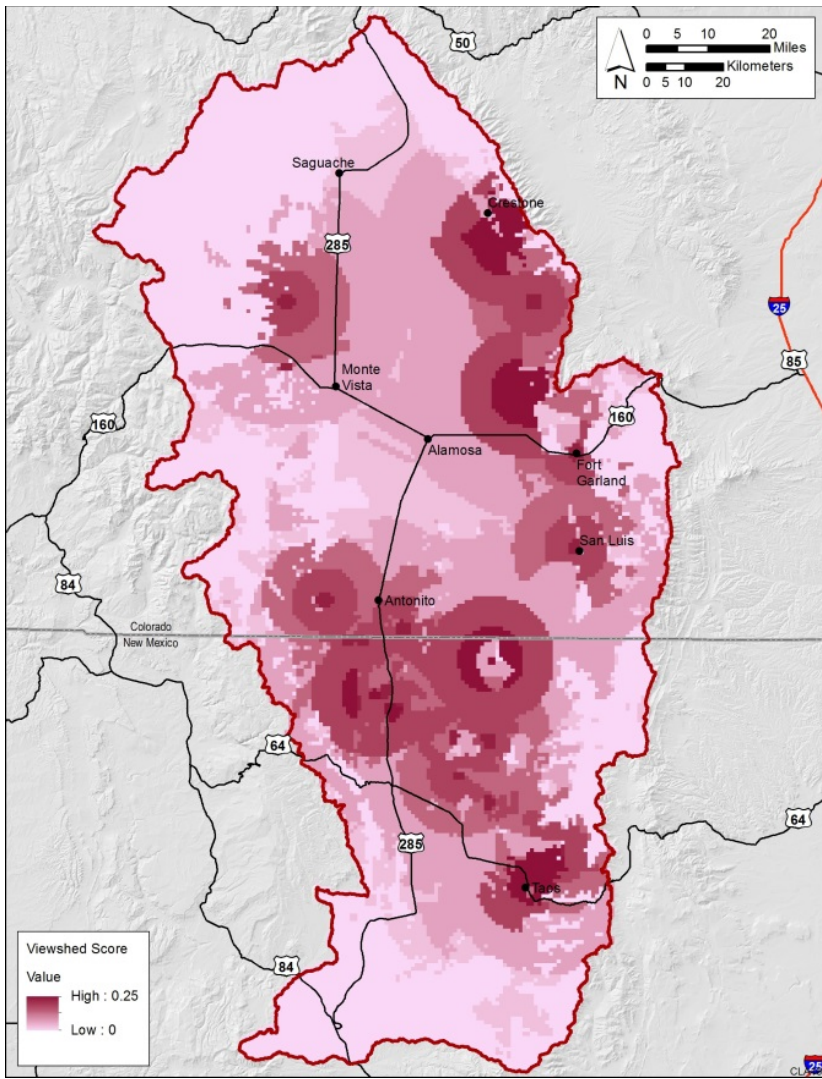


FIGURE 4 Viewshed Analysis Results

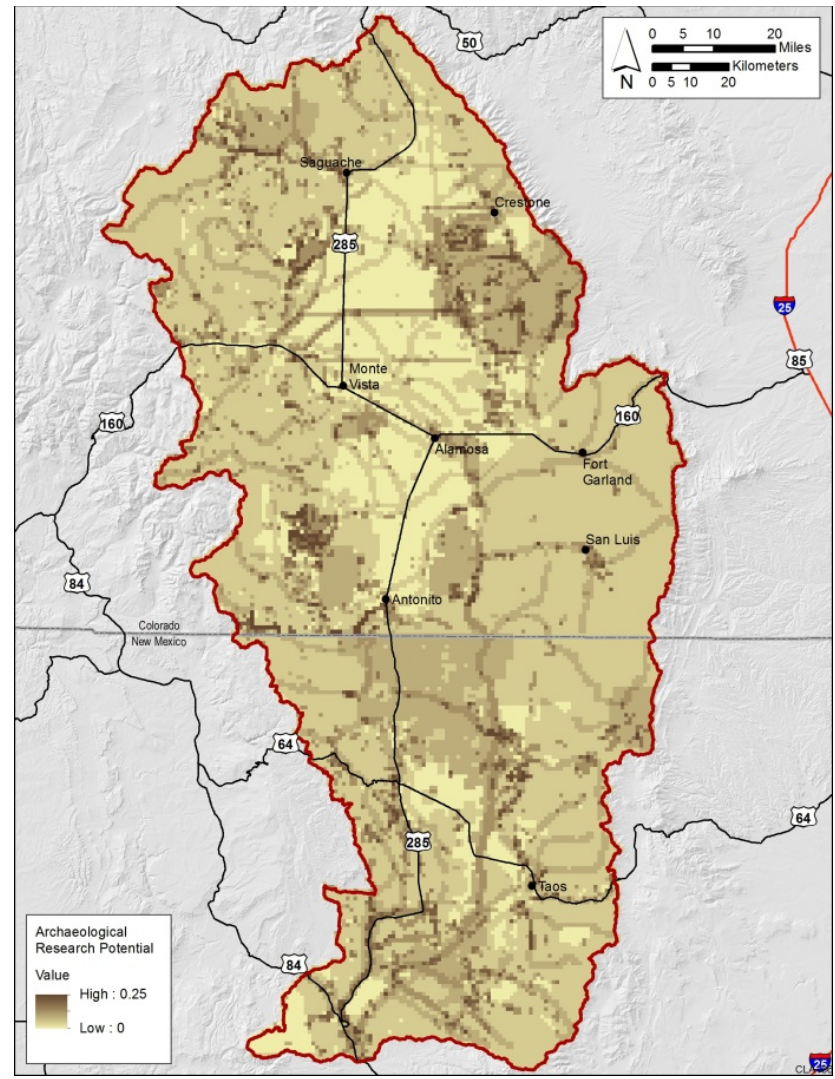
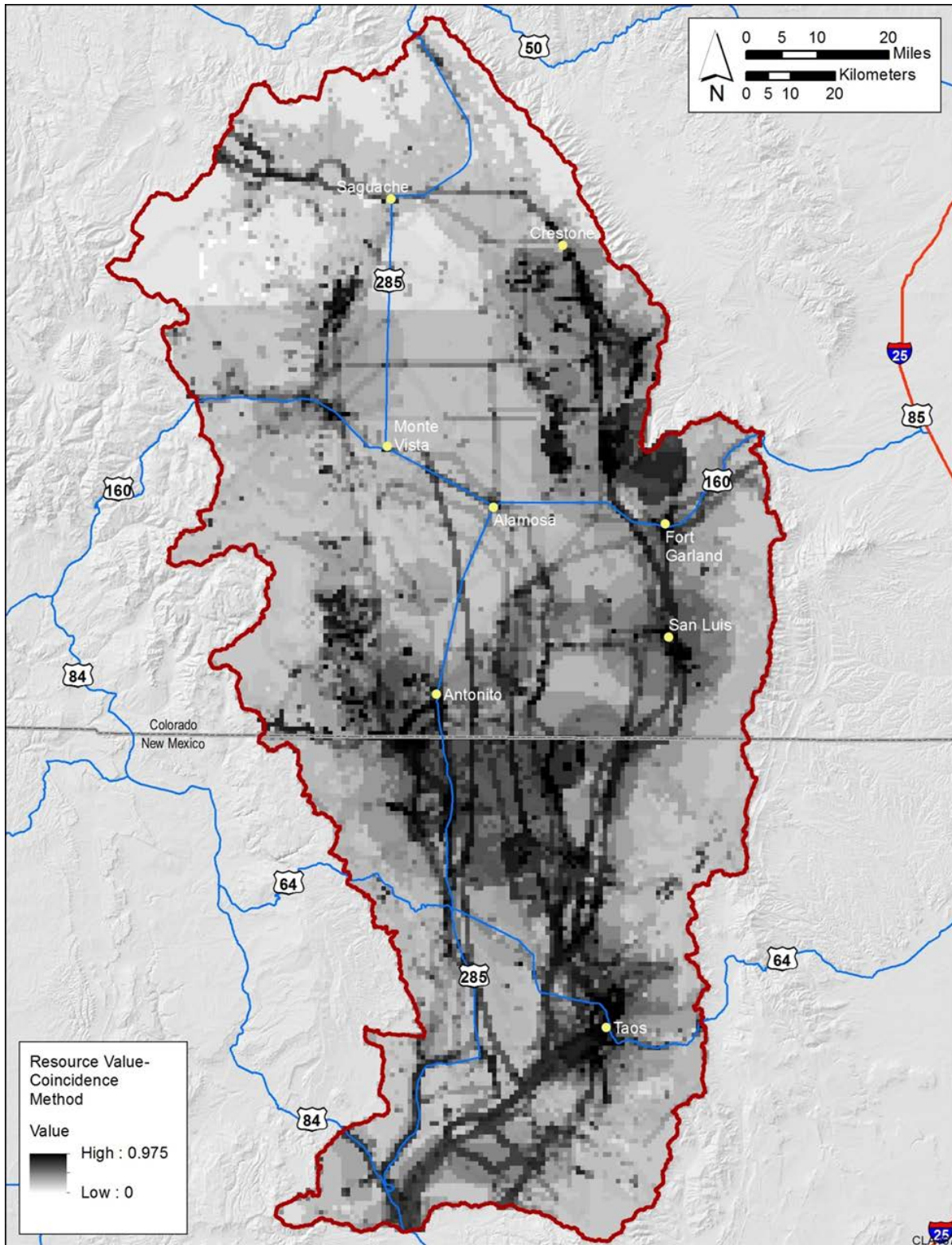


FIGURE 5 Archaeological Research Potential Results



**FIGURE 6 Cultural Resource Values Results**

weighted 50% of the total cultural value, and viewshed value and research potential were weighted 25% each, so when combined they totaled a value ranging from 0 to 1. The next step in the assessment was to determine the trends and determine what may be at future risk based on the trajectories of the change agents. Figure 7 shows how risk was calculated using the modeling of likely future conditions for areas likely to experience climate change, wildfire, and the spread of invasive species, as well as the added areas of anticipated future new development. Each of the change agents was weighted equally in this modeling exercise (i.e., at 25%). However, the change agent weighting in the model could be adjusted in the future, if it is determined to be likely that certain change agents affect cultural resources more heavily than others.

The resulting trends evaluation indicated that there are certain areas in the ecoregion that have both high cultural value and high levels of risk of change from one or more of the change agents (areas shown in red in Figure 8). These areas are potentially at greatest risk for possible loss or degradation and may be in need of near-term actions, such as fencing, data recovery, erosion control, administrative protections, law enforcement, etc. The recommended actions and time frames would depend on resource-specific factors, the administrative as well as environmental setting, and the parameters in the model that indicate the source of high risk. Similarly, for certain areas in the ecoregion, the evaluation indicated high cultural value paired with low levels of risk from the change agents (areas shown in green in Figure 8). These areas, irrespective of administrative or jurisdictional constraints that may affect future actions, are potentially very stable locations that may make excellent research areas, conservation areas, or preserves depending on the resources present and their integrity.

The results of the cultural assessment can support regional compensatory mitigation evaluations, through identifying the cultural values and risk levels of potential mitigation actions and locations. The BLM's identification of locations with both high ecological value and high cultural value, where compensatory mitigation would have additive benefits, is particularly valuable.

# Change Agent Risk

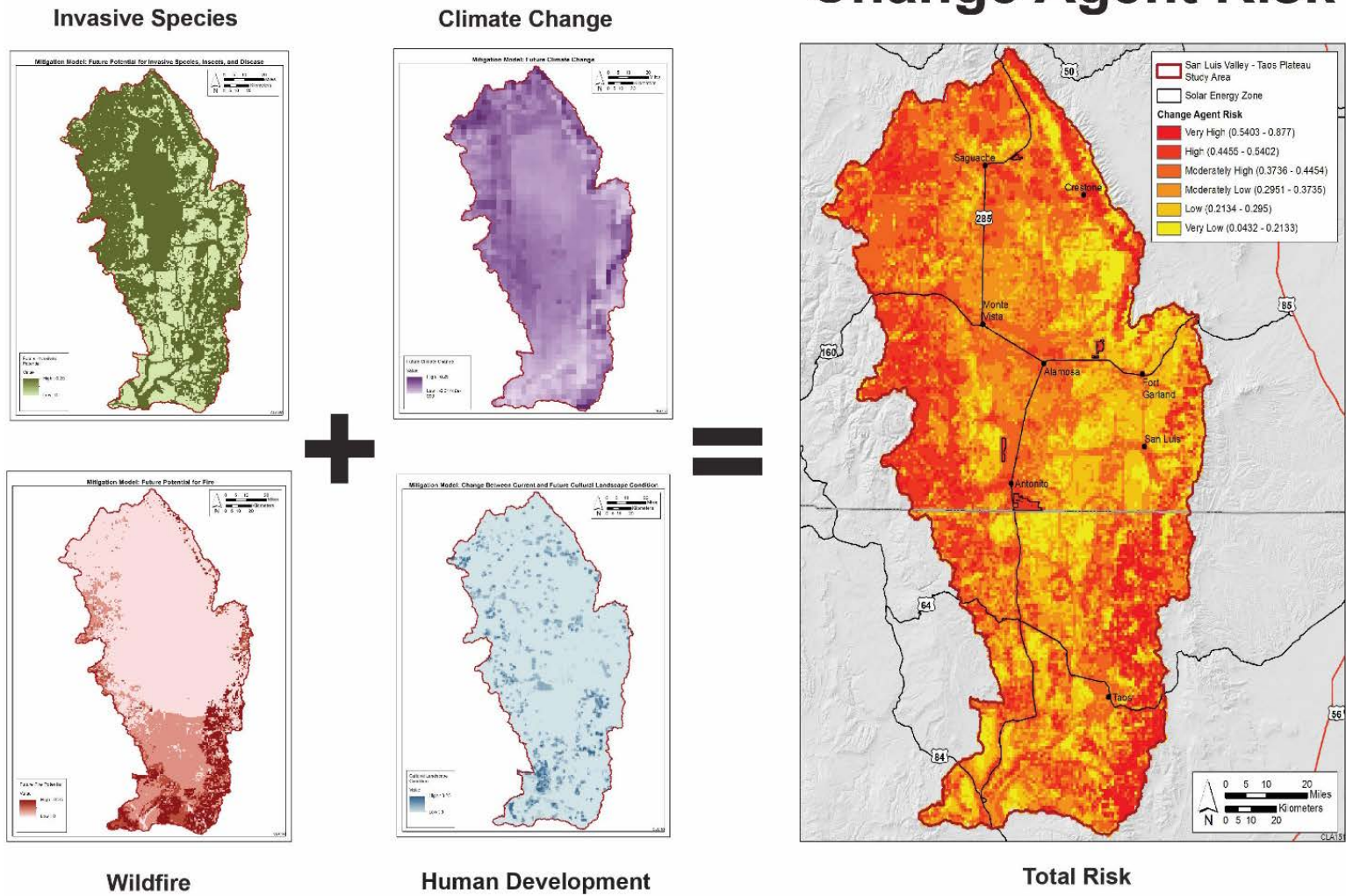
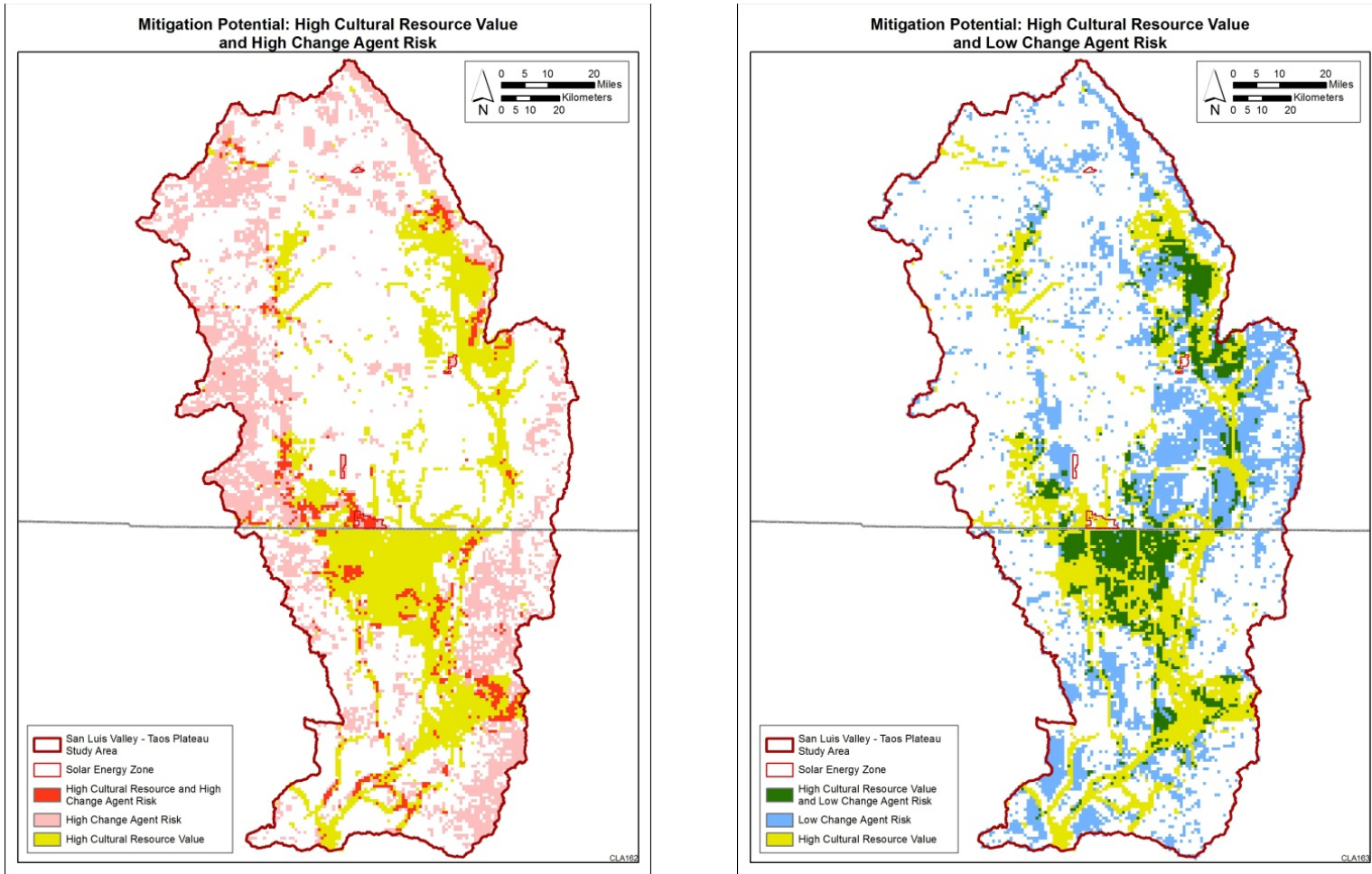


FIGURE 7 Calculation of Areas of Greatest Risk Resulting from Projected Future Conditions



**FIGURE 8** Areas of High Cultural Heritage Value and High and Low Risk Levels from Future Trends of Change Agents

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