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LAND-AND RESOURCE-USE ISSUES AT THE

VALLES CALDERA\*

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# LAND AND RESOURCE USE ISSUES AT THE VALLES CALDERA

Paul Intemann

## ABSTRACT

The Valles Caldera possesses a wealth of resources from which various private parties as well as the public at large can benefit. Among the most significant of these are the geothermal energy resource and the natural resource. Wildlife, scenic, and recreational resources can be considered components of the natural resource. In addition, Native Americans in the area value the Valles Caldera as part of their religion. The use of land in the caldera to achieve the full benefits of one resource may adversely affect the value of other resources. Measures can be taken to minimize adverse affects and to maximize the benefits of all the varied resources within the caldera as equitably as possible. An understanding of present and potential land and resource uses in the Caldera, and who will benefit from these uses, can lead to the formulation of such measures.

## INTRODUCTION

The Valles Caldera is located in north central New Mexico in the Jemez Mountains about 96 km (60 mi) north of Albuquerque. The caldera is the remains of a volcano that violently exploded and collapsed a little more than a million years ago. It is circular in form with a diameter of about 19 to 23 km (12 to 15 mi). The outer part of the caldera is a nearly continuous mountainous rim while the interior consists of spacious valleys interrupted by mountainous domes.<sup>2</sup> Because of the caldera's geological, natural and scenic significance, it has been designated a national natural landmark.<sup>3</sup>

Much of the land in the central part of the caldera is privately owned by the Baca Land and Cattle Company (Fig. 1). This large piece of undivided property is known as the Baca Ranch or Baca Location No. 1. Logging in the caldera has been discontinued but the land is still used for the grazing of cattle. The geothermal rights associated with the Baca Ranch are leased to Union Geothermal Co. (Union). Most of the land surrounding the Baca Ranch is part of the Santa Fe National Forest or Bandelier National Monument. Several Native American pueblos are located in the vicinity.

The resources of the Valles Caldera can be divided into two classes. The first class consist of basic economic resources while the second class is not.

#### ECONOMIC RESOURCES

The U.S. Geological Survey has estimated that up to 81,000 MW-yr of electricity might potentially be produced by geothermal energy at the Valles Caldera making it one of the nation's most significant sources of geothermal energy for such a purpose.<sup>4</sup> Union has conducted a thorough exploration program in the Redondo Creek and Sulfur Creek areas in the western part of the caldera. This program included the drilling of 22 wells. The resulting information indicates that the geothermal reservoir can supply a 50 MWe power plant, and it may be sufficient to supply enough energy to produce 400 MWe for 30 years. Although recently drilled wells are producing less than expected, Union has not lowered these estimates.<sup>5</sup> After an adequate geothermal supply is proven by Union, the Public Service Co. of New Mexico (PNM) will construct and operate a 50 MWe power plant and purchase from Union steam separated from the geothermal fluid. Upon the successful operation of this plant, PNM plans to build additional geothermal power plants in the caldera.<sup>6</sup>

The public interest is served by development of geothermal energy. Development of new domestic energy sources including geothermal reduces the nation's dependence on foreign oil and thereby improves economic conditions and national security. To this end, the U.S. Department of Energy (DOE) has decided to assist in the funding of a 50 MWe geothermal power plant at the Valles Caldera in order to demonstrate the development of a liquid-dominated geothermal resource.

Although the geothermal resource is by far the greatest economic resource in the Caldera, it is not the only one. A considerable stand of timber exists in the Caldera and a significant number of cattle graze in the Caldera especially in the valley meadows.

#### NATURAL AND CULTURAL RESOURCES

The natural and cultural resources of the Valles Caldera are highly valued. The entire Baca Ranch was designated a national natural landmark by the Heritage Conservation and Recreation Service in 1975 because its geologic, scenic, and natural features are nationally

significant.<sup>8</sup> The Valles Caldera has been seriously considered a potential addition to the national park system several times since 1962. Because the Valles Caldera is one of the largest in the world it is a rare geological feature. The caldera has been described as a "magnificent scenic resource"<sup>9</sup> and a "scenic wonderland"<sup>10</sup> because of its unusual topography and abundant vegetation and because it is relatively well preserved in its natural state.<sup>11</sup> Based on wildlife diversity the U.S. Fish and Wildlife Service has described the area in the caldera as a unique ecosystem that has national significance.<sup>12</sup> The objective of preserving the natural quality of the caldera is made explicit by its landmark status.<sup>13</sup> The state of New Mexico has recognized the scenic and recreational value of two streams which at least partially flow through the caldera by designating them as recreational river areas.<sup>14</sup>

The U.S. Department of Interior (DOI) has studied a variety of options for management of the Valles Caldera, including public acquisition of the Baca Ranch.<sup>15</sup> The public's enjoyment of the caldera is presently limited to the view from a highway that passes through the southern part of it. However, the caldera has significant potential for serving the public's recreation needs. The Jemez Mountains currently receive heavy recreational use<sup>16</sup> and demand for recreation<sup>17</sup> will continue to increase in the region. The caldera "could undoubtedly provide significant additional recreational opportunities for the region," and it would receive both regional and national visitation.<sup>18</sup> The list of recreational activities for which the caldera is suited is extensive and includes hunting, fishing, hiking, camping, picnicking, bicycling, snowmobiling, skiing, ice skating, and bathing at hot springs or spas. Exploitation of the caldera's recreational resources, like exploitation of its other resources, could adversely affect it as well as the surrounding area.

Native Americans in the region value the Valles Caldera in a special way as a part of their religion. Native Americans were the first humans to settle the region, and they had developed their own culture prior to the arrival of Europeans or European descendants. A very different culture with many concepts entirely alien to their own was imposed upon them first by the Spanish and later by the U.S. However, many of the Native Americans currently practice their

religion in much the same way as they did prior to this imposition. They feel that their religion is the only part of their culture they still retain.<sup>19</sup> Their religion is based on the sacredness of nature and man's existence in harmony with it.

The Native Americans consider the Valles Caldera sacred, and they especially revere particular features including hot springs and mountain summits. Numerous sacred sites and religious shrines exist in the project area of the proposed geothermal power plant. Perhaps the attitude of Native Americans toward geothermal development in the caldera can best be characterized by the comment that "the Pueblo feels that it has a lot to lose and nothing to gain."<sup>20</sup> The rights of Native Americans to practice their religion, including access to sacred sites, is especially protected by the Federal American Indian Religious Freedom Act. On January 16, 1981, Native Americans filed suit against DOE to halt Federal involvement with the geothermal power plant claiming that it violated the American Indian Religious Freedom Act.<sup>21</sup>

#### SEEKING A BALANCE

Clearly, the management of all the resources at the Valles Caldera is a complex issue. The public has an interest in both developing the geothermal resource and preserving the natural quality of the caldera. Geothermal development along with land subdivision, excessive logging and grazing, and lack of wildlife management has been cited as a major threat to the natural and scenic resource.<sup>22</sup> Because DOI regarded the caldera as a potential unit of the national park system it refused to support the action by DOE to assist in funding of the geothermal power plant.<sup>23</sup>

However, total preservation of the entire caldera could preclude geothermal development. The argument that any geothermal development will compromise the natural scenic quality of the caldera has merit. However, the proposition that geothermal rights in the caldera can be taken without compensation at prohibitive public cost is tenuous. The issue is not how to prevent geothermal development but rather how to accommodate it while also accommodating the other resources in the caldera. Neither the development of geothermal energy irrespective of the caldera's natural quality nor the maintenance of this quality irrespective of the caldera's geothermal potential is suitable. Reliance on

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fortuitous circumstances to determine the use of these resources is a poor alternative to skillful planning and management which utilizes the democratic tradition of compromise. An effective management plan could be more advantageous to each public and private interest than the risk of loss without it. Geothermal development could develop at an orderly pace, legal access of Native Americans to sites in the Baca Ranch property could be expanded, and the public's opportunity to enjoy the caldera could be augmented.

Fortunately, there are well established devices including land use controls which can be used for optimizing the use of the caldera's multiple and diverse resources of national significance. It is also fortunate that the current owner is concerned with preservation of the natural resource and "appears to be interested in seeking a viable means for [its] long-term protection".<sup>24</sup> No single device is likely to be the perfect solution, but rather an combination of several may be most suitable. A detailed cost-benefit evaluation of each measure or set of measures is beyond the scope of this paper. Only a brief range of exemplary possibilities is summarized here.

Zoning is a familiar control which might be used as part of a management plan for the caldera, and it is implied by DOI's suggestion that "consideration should be given to confining the geothermal development to the Redondo Creek, Sulfur Creek and Alamo Canyon areas".<sup>25</sup> Presently, no zoning ordinances affect the land occupied by the caldera.<sup>26</sup> Zoning of private property for the purpose of maintaining health, safety, and welfare is a power granted to counties by the state as long as it does not constitute a taking without compensation. Zoning for the purpose of preserving nationally significant resources has been upheld by the courts.<sup>27</sup> As an example of how zoning might be applied to the caldera, the Redondo Creek, Sulfur Creek, and Alamo Canyon areas could be zoned for geothermal development, other areas could be zoned for controlled logging and grazing, and other areas could be zoned for recreational use. Geothermal development could be prohibited above certain elevations and industrial development other than geothermal could be prohibited entirely. One shortcoming to zoning is that the caldera cannot be zoned unless the entire county is. Another shortcoming is that zoning by the

county may not be adequately responsive to national interest in the caldera.

Management of the caldera's multiple resources could be linked with the National Environmental Policy Act (NEPA) when Federal action is involved. Regulations for the enforcement of NEPA require that federal agencies impose appropriate conditions for funding or approval of actions.<sup>28</sup> Such conditions for funding of the power plant could possibly include substantial controls on the location and features of not only that geothermal development necessary for the first power plant but also the geothermal development that would be induced by its successful operation. DOE has decided to impose no conditions regarding the siting of power plants or related facilities.<sup>29</sup> A second federal action affecting the caldera will be the permitting of electric transmission lines passing through national forest land from the caldera to existing or new substations. The National Forest Service has already indicated that it may use its permitting power to affect the location of transmission lines in the caldera.<sup>30</sup> The Forest Service is less likely to be able to control other aspects of development within the caldera while it remains private property.

Management of the caldera's resources could result from the exercise of eminent domain by a public agency to purchase the Baca Ranch property. This option is explored at greater length in the DOI study. Purchase of the property could allow a public agency considerable control over not only geothermal development but also other resource uses. A major shortcoming of this operation is the significant public cost required to provide compensation to the private landowner.

A management option intermediary between zoning and eminent domain is the purchase of development rights or easements. Instead of purchasing the entire fee-simple estate, only those property rights that are necessary for resource management would be purchased. An advantage to this relatively new technique is its flexibility. The right to subdivide the land might be purchased, with a restrictive covenant to that effect placed in the deed. Access easements could be purchased so that Native American would be legally guaranteed access beyond that which they currently have. Rights to geothermal development might be purchased to restrict development above certain elevations or at certain other sensitive locations. If

purchase of development rights is substantially less than the purchase of the fee-simple estate, it could be an attractive option. The public cost required for compensation would be minimized to only that which is necessary for control while taxes on the property, although likely to be reduced, could still generate revenue for the county.

#### CONCLUSION

The resource and land issues involving the Valles Caldera are similar to ones the geothermal industry can expect to face frequently in other situations. In fact it may well be these types of issues rather than technical ones which control the industry's rate of growth. The Clear Lake area, Long Valley, and the Cascade Mountains are examples of other places where difficulties may arise. If the geothermal industry is to assist in meeting the nation's energy needs, it must collaborate with government to anticipate these issues, analyze them, and actively seek measures which address them.

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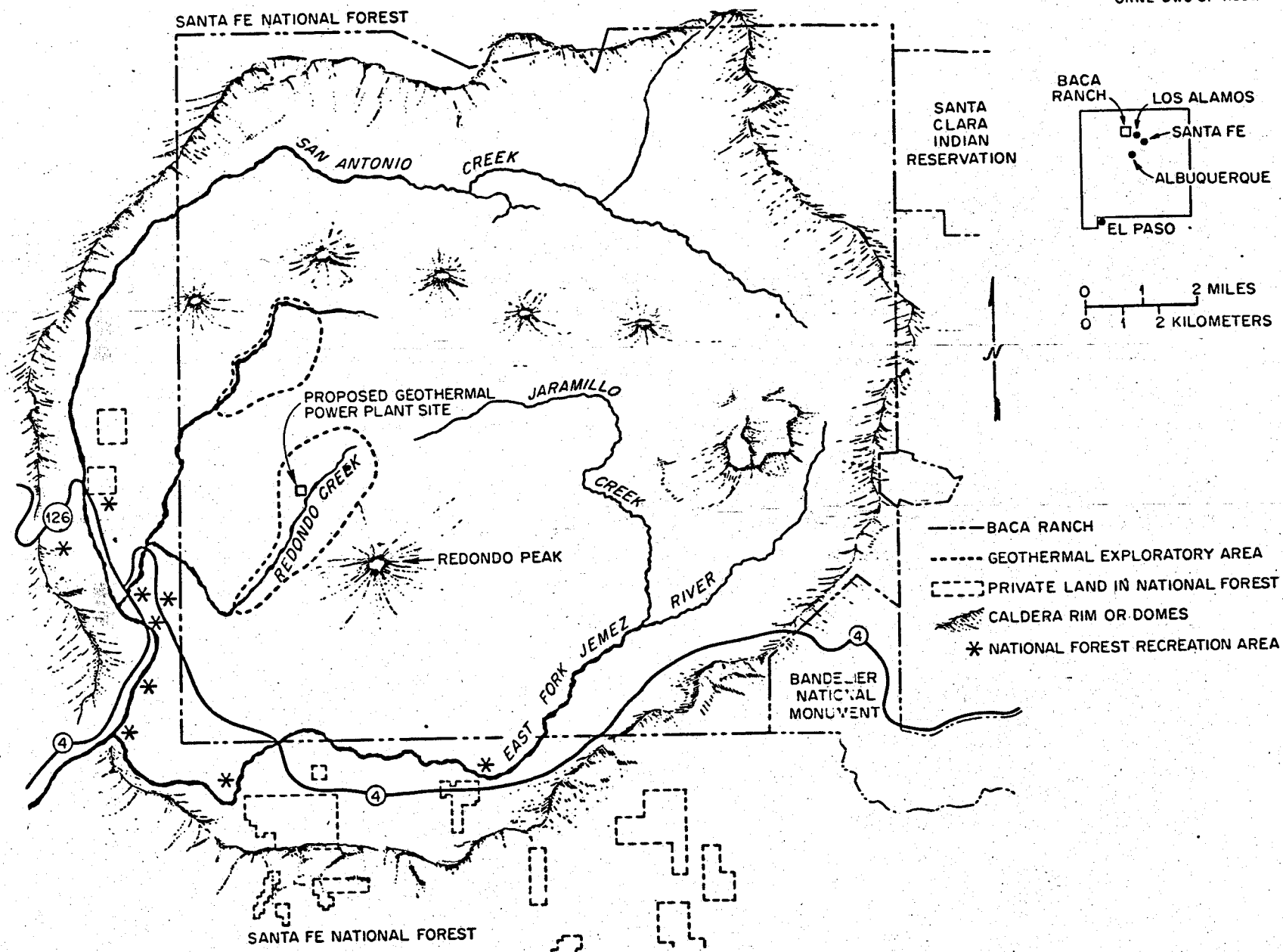


Figure 1. Land Use at the Valles Caldera